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Contributions to the Botany of Vermont, V.

UNIV. OF CALIFORNIA

THE TREES OF VERMONT

By Anna M. Clark

WITH NOTES ON THE TREES OF BURLINGTON AND VICINITY

By L. R. Jones

Published by the Botanical Department of the University of Vermont.

DECEMBER, 1899

Second Edition Issued March, 1902

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This second edition is an exact reprint of the earlier one except that the Notes on the Trees of Burlington and Vicinity are massed in the appendix instead of being interleaved as in the earlier edition. Minor additions and corrections might be made but as they are relatively so unimportant it seems better to let it appear as an exact reprint.

L. R. J.

March, 1902.

INTRODUCTION TO THE BURLINGTON EDITION.

The body of this pamphlet was recently published by the Vermont experiment station for free distribution as Bulletin 73 of their series. The pages bearing simple numbers of the present interleaved edition have been printed from the same type with no change in page numbers or in the text except the addition of the footnote on page 58.

The interleaved notes on the trees of Burlington and vicinity have been prepared with especial reference to their usefulness to the University students and to those teachers and pupils in the city schools who are interested in nature study, but it is hoped that some copies may reach the hands of lovers of trees outside of these circles. The writer has been at some pains to make the references definite and exact and to select conspicuous or typical specimens of trees. Errors and omissions are scarcely avoidable, however. Inasmuch as it is hoped to prepare a revision of these notes at some future day, advise as to corrections or desirable additions will be received gladly. The writer will be especially grateful for further information relating to any of the older trees which serve as landmarks in the city or vicinity.

L. R. J.

CONTRIBUTIONS TO THE BOTANY OF VERMONT

This is issued as Number V of the Contributions to the Botany of Vermont. The other numbers issued to date are as follows, and are offered in exchange or for sale (postpaid) by the Botanical Department, University of Vermont:

I. A LIST OF THE MOSSES OF VERMONT, with Analytical Keys to the Genera and Species, by A. J. Grout..38 pages, 15 cents

II. A PARTIAL LIST OF THE PARASITIC FUNGI OF VERMONT, by W. A. Orton.... .... 24 pages, 10 cents

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V. THE TREES OF VERMONT, (Illustrated) by Anna M. Clark, with NOTES ON THE TREES OF BURLINGTON AND VICINITY, by L. R. Jones...................100 pages, 25 cents

UNIVERSITY OF VERMONT
AND STATE AGRICULTURAL COLLEGE

UNIV. OF CALIFORNIA

VERMONT AGRICULTURAL

EXPERIMENT STATION

BURLINGTON, VT.

BULLETIN No. 73

OCTOBER, 1899

The Trees of Vermont

BURLINGTON, VT:
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1899.

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BULLETIN NO. 73: THE TREES OF VERMONT

By Anna M. Clark[1]

UNIV. OF CALIFORNIA

INTRODUCTION

The following account aims to include the native and spontaneous trees of the state, together with brief mention of such others as are commonly cultivated. It is primarily addressed to readers who have little or no botanical training, but who may wish to learn the names of the trees and the characters by which they may be recognized as well as the main facts as to their occurrence and distribution in the state. It is believed that the drawings and simple keys accompanying the text will make this possible to all.

It has for some time been evident that such a publication would be widely welcomed. Vermont is a richly wooded area. Much of its wealth is directly or indirectly dependent upon its forests. Its growing fame as a region of summer homes is largely because of its attractive trees and forest areas. Moreover Vermont is peculiar in that the tree-covered areas are on the increase. It is well that this is so, for trees of the right kind are the most profitable crop that can be grown on a considerable portion of the hills and mountains of the state. The fact that this is being more emphatically taught by the board of agriculture and more commonly accepted as a guiding principle by the farmers of the state promises well for improved methods of farm and forest management during the present generation and for more valuable lands to be inherited by the next.

The intelligent fostering of this tree growth and the appreciation of its beauty as well as of its value is in a considerable measure dependent upon discriminating acquaintance with the different kinds of trees found in our forests. Few realize how many kinds there are. Within easy walking distance of the University at Burlington there occur, native, or spontaneous, sixty kinds of trees. There is a greater variety of trees in the Champlain valley than in the interior of the state, yet the number of kinds to be found in any natural forest of limited area will be a pleasing revelation to one exploring it thoroughly.

It is especially to the children of Vermont and to the teachers of these children, either at home or in school, that it is hoped this publi-

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[1] Prepared under the direction of L. R. Jones. Edited by Clifton D. Howe and W. W. Eggleston.

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cation will prove most interesting and most useful. A familiar acquaintance with the common trees and other plants of the neighborhood, together with their general characters and uses should be, and before long will be, an essential part of the education of every school boy and school girl.

Each should learn to recognize as many of the trees as occur commonly in his vicinity by leaf, fruit or bark. Nor will this be found very difficult if some study is given to the following pages.

The use of technical botanical terms has been avoided. It is realized that this has in some cases been attended by a loss of precision, but the larger gains must outweigh such minor losses. In all cases the drawings are intended to supplement the keys and descriptions. They were carefully made to scale, and the reduction from natural size is indicated by the accompanying fraction. Thus white pine ×½ indicates that the illustration shows the parts of this pine one-half natural size.

It is highly desirable that there should be greater uniformity in the popular use of plant names and especially of the names of trees. In order to bring this about Mr. G. B. Sudworth recently prepared a list of the preferred English names of the trees of the United States (U. S. Dept. Agr., Div. Forestry, Bul. 17). The usage of this article is in accord with Sudworth's recommendations and teachers are urged to follow it. Names, other than the preferred one, which may be commonly used in the state are included in parentheses. The Latin names are in general those of Sargent's Sylva of North America. Where these differ essentially from those of the botanical manuals in common use in the state the synonyms are added.

A practical difficulty was met in the deciding exactly what to include under the name tree. Nature makes no sharp distinctions between trees and shrubs. Professor Sargent in the Sylva of North America considers as trees all woody plants which grow up from the ground with a single stem, excluding all such as habitually branch at the ground into a number of stems. It did not seem expedient to follow exactly these lines in the present publication. It may be useful, however, to add the names of the species native to Vermont which are included as trees by Professor Sargent in this Sylva, but which are not described in the following pages:

The common juniper *Juniperus communis;* four willows, *Salix discolor, S. rostrata, S. longifolia, S. lucida;* witch hazel, *Hamamelis Virginiana;* two sumachs, *Rhus typhina* and *R. copallina;* flowering dogwood, *Cornus florida;* mountain laurel, *Kalmia latifolia;* great rhododendron, *Rhododendron maximum;* sheepberry, *Viburnum lentago;* bear oak, *Quercus ilicifolia.*

Much help was received in the preparation of this article from Sargent's Sylva of North America and from Emerson's Trees and Shrubs of Massachusetts. The first complete discussion of the occurrence and distribution of the trees in the state is found in Oakes' list of Vermont plants, published in Thompson's Natural History of Vermont in 1842. A supplement to this was prepared by Professor Joseph Torrey in 1853. Professor Perkins again summarized the available information in his Flora of Vermont in 1887. The forest flora of the Connecticut valley was well discussed by Flint and Jesup in their Trees and Shrubs of New Hampshire, 1891. The information furnished in the above lists has been freely drawn upon.

C. G. Pringle very thoroughly explored the forest areas of the Champlain valley and of northern Vermont some twenty-five years ago. More recently this work has been continued by several botanists. It is not expedient here to mention the contributions of all, but credit must at least be given to those of President Ezra Brainerd regarding the flora of Addison county, of Dr. A. J. Grout regarding that of Windham county and of W. W. Eggleston regarding that of Rutland county. Mr. Eggleston has in addition made several trips through Bennington county and has also explored parts of the extensive forest areas of Essex county, thus adding much to the accuracy of the information regarding each of these regions. As a result it is believed that the general facts concerning the distribution of the trees of the state are fairly well understood and the attempt has been made to summarize these in the present list. There is still opportunity, however, for the botanical exploration of the forests, especially in the southern and the northeastern portions of the state and it is hoped that such imperfections as exist in this publication may be a stimulus in this direction.

The preparation of the drawings[1] and of the original manuscript was made by Miss Clark in connection with the botanical studies of her senior year at the University of Vermont (1897-8). The publication was delayed a year and a half and the rapid increase in knowledge of the state flora during this period made some revision necessary. Mr. Clifton D. Howe had immediate charge of this revision and of the final preparation of the matter for the press. Mr. W. W. Eggleston contributed much to the value of the publication by carefully revising and editing the statements concerning the occurrence and distribution of the species, especially as regards the Connecticut valley and southwestern Vermont. Professor F. A. Waugh furnished the statements about the cultivated plums and cherries and aided in other ways.

Thanks are due President Ezra Brainerd, Professor F.A.Balch, Rev. J. A. Bates, and other members of the Vermont botanical club who have kindly offered suggestions and read proofs.

L. R. JONES.

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[1] The drawing illustrating the balsam fir was made by Miss Ella K. Herrick.

THE TREES OF VERMONT

(*) indicates introduced species now spontaneous; (†) occur only in cultivation.

- PINE FAMILY
  - Scotch pine (†)
  - Austrian pine (†)
  - White pine
  - Red pine
  - Pitch pine
  - Jack pine
  - Tamarack
  - Black spruce
  - Red spruce
  - White spruce
  - Norway spruce (†)
  - Colorado blue spruce (†)
  - Hemlock
  - Balsam fir
  - Arbor vitae
  - Red juniper
- WALNUT FAMILY
  - Butternut
  - Black walnut (†)
  - Bitternut hickory
  - Shellbark hickory
  - Pignut hickory
- WILLOW FAMILY
  - Black willow
  - White willow(*)
  - Crack willow (*)
  - American aspen
  - Largetooth aspen
  - Balm of gilead
  - Cottonwood
  - White poplar (*)
  - Lombardy poplar (*)
- BIRCH FAMILY
  - White birch
  - European white birch (†)
  - Paper birch
  - Yellow birch
  - Sweet birch
  - Hornbeam
  - Blue beech
- OAK FAMILY
  - Beech
  - Chestnut
  - White oak
  - Bur oak
  - Chestnut oak
  - Chinquapin oak
  - Dwarf chinquapin oak
  - Swamp white oak
  - Red oak
  - Scarlet oak
  - Yellow oak
- ELM FAMILY
  - Slippery elm
  - White elm
  - Cork elm
  - English (cork) elm (†)
  - Scotch (weeping) elm (†)
  - Hackberry
- MULBERRY FAMILY
  - Red mulberry
  - White mulberry (*)
- MAGNOLIA FAMILY
  - Tulip tree
- LAUREL FAMILY
  - Sassafras
- PLANETREE FAMILY
  - Sycamore
- ROSE FAMILY
  - Apple (*)
  - Pear (†)
  - Crab apple (†)
  - Mountain ash
  - Elderleaf mountain ash
  - European mountain ash (*)
  - Serviceberry
  - Scarlet hawthorns
  - Longspine hawthorn
  - Dotted hawthorn
  - English hawthorn
  - Canada plum
  - Wild red cherry
  - Choke cherry
  - Black cherry
  - Garden cherries (†)
  - Garden plums (†)
- PULSE FAMILY
  - Locust (*)
  - Honey locust (†)
  - Coffeetree (†)
- MAPLE FAMILY
  - Mountain maple
  - Striped maple
  - Sugar maple
  - Black maple
  - Silver maple
  - Red maple
  - Norway maple (†)
  - Boxelder
  - Horse chestnut (†)
  - Buckeyes (†)
- BUCKTHORN FAMILY
  - Buckthorn (*)
- LINDEN FAMILY
  - Basswood
- DOGWOOD FAMILY
  - Sour gum
- OLIVE FAMILY
  - Black ash
  - White ash
  - Red ash
  - Green ash
- BIGNONIA FAMILY
  - Catalpas (†)

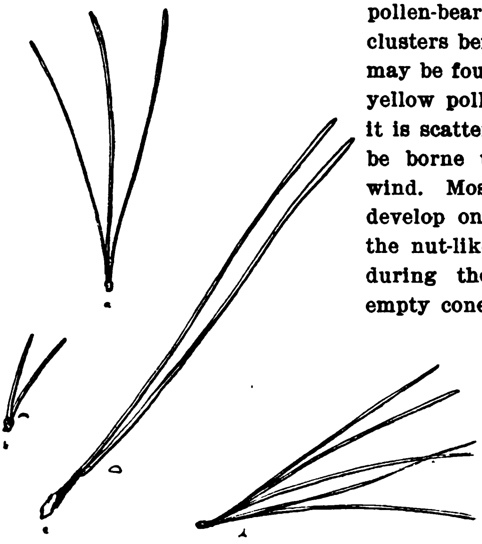
PINE FAMILY

THE PINES

The pines are the largest and most useful group of trees included in the great cone-bearing family. There are in the eastern United States nine different species, four of which are found in Vermont.

The pines, like the other trees of this family, produce their seeds in cones. The pines are peculiar, however, in that their cones require two years for maturing. The flowers also take the form of cones, the pollen-bearing and the seed bearing clusters being separated, though both may be found on the same tree. The yellow pollen matures in May, when it is scattered in great abundance, to be borne to its destination by the wind. Most of the seed-bearing cones develop on the upper branches, and the nut-like seeds escape from them during the second autumn. The empty cones with opened scales may thereafter cling to the tree for some time or they may soon fall.

The leaves of all the evergreens cling to the branches several years. The leaves of the white pine, for example, drop when they are three or four years old. The arrangement of the leaves, or needles, in clusters of from 2 to 5, with the base of each cluster encased in a delicate sheath, offers a simple means of distinguishing the species.



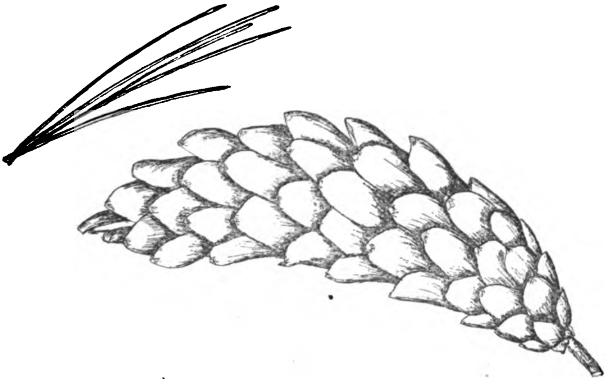
PINE LEAF CLUSTERS
a, Pitch; b, Gray; c, Red; d, White. All × ½

Leaves 5 in each cluster	White Pine
Leaves 3 in each cluster	Pitch Pine
Leaves 2 in each cluster	
Leaves 4 to 6 inches long	Red Pine
Leaves 1 or 1½ inches long	Gray Pine

Introduced species.—Two European pines are sometimes planted as ornamental trees in Vermont, the Austrian and the Scotch. The Scotch pine has leaves, 2 in a cluster, 2-4 inches long, flat and of a bluish-white hue. The Austrian pine has dark green, slender, rigid leaves, 2 in a cluster, 4-6 inches long.

WHITE PINE. *Pinus Strobus* Linn.

The white pine, growing as it sometimes does to the immense height of two hundred feet or more, was one of the loftiest trees of the primeval New England forest. Lumbermen have removed most of the patriarchs and only the younger trees commonly remain. The species, though widely scattered in Vermont, occurs most abundantly in the Champlain and Connecticut valleys. The slender lustrous leaves are borne in close clusters and give a beauty and delicacy of foliage possessed by no other pine.


WHITE PINE

Cone and leaf cluster, × ½

The white pine takes its name from the color of its wood, which is soft, easily worked and is much used in all kinds of light woodwork. It is especially sought for inside house finishing. It is one of the most valuable and most rapidly growing timber trees in the state. The renewal of the pine forests should therefore be encouraged.

RED PINE (NORWAY PINE). *Pinus resinosa* Ait.

The red pine is much less common in Vermont than the white pine. Scattered groups or small groves of it occur on the dry, rocky headlands of Lake Champlain and it may be found in similar soils in the river valleys throughout the state, although it is less frequent in the southern portions. Its heavier clusters of foliage with long leaves in pairs, serve to make its recognition easy. The cones are about two inches long at maturity.

The name red pine is appropriate both because of the pale red color of the heart-wood and the distinctly reddish cast of the bark. This species does not grow in Norway or elsewhere in Europe, and it is said that it received the name from the town of Norway, Maine. The name Norway pine has so little fitness as applied to this tree, and is so evidently misleading that its use is to be discouraged.

The Latin name suggests a resinous wood, but in fact it is less so than either of the other pines. The wood is light, hard, close grained, and is largely used for bridge and building timbers. The picturesqueness and individuality of the red pine commend it for wider use as an ornamental tree.

PITCH PINE. *Pinus rigida* Mill.

The pitch pine is one of the more southern species, and is nearly at its northern limit in Vermont. The pines all flourish in light soils, but the pitch pine seems to thrive best in dry barren sand plains. In such locations it occurs abundantly in the northern parts of the Champlain valley, especially along the lower courses of the Winooski, Lamoille and Missisquoi rivers. It is also scattered along the Connecticut river valley.

In suitable places it forms dense groves of small trees, forty to sixty feet in height. The individual trees are sometimes picturesque but not graceful or otherwise very attractive in appearance. The branches of even the smaller trees mature numerous cones, which are long persistent. They are about two inches long and have the scales tipped with sharp recurved prickles, a character which may aid in the recognition of the species.

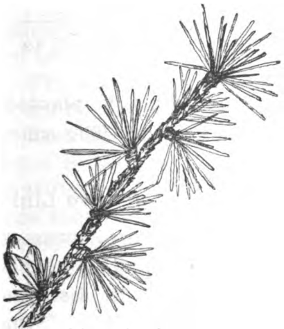
The wood is hard and resinous. Turpentine and tar were formerly obtained from it in New England. This resinous quality adds to its value as a fuel and for kindling wood. This is the principal use made of it at present.

JACK PINE (GRAY OR SCRUB PINE). *Pinus divaricata* (Ait) Du Mort., *P. Banksiana* Lamb.

The gray pine is the smallest of the Vermont pines with sprawling habit and short stout leaves, giving the tree a bristly, stunted appearance. Its characteristic cones are pointed and curved toward the main axis of the stem, often partially encircling it. The gray pine is a northern species extending to the Arctic region, and the line of its southeastern limit passes through northern Vermont. It is one of the rarest of our trees, and but few specimens are known to occur in the state. Mr. Rowland E. Robinson of Ferrisburgh discovered a small grove of it in 1860. Scattered trees have since been found in Monkton, Starksboro and Fairfax. It probably occurs in other places in northern Vermont. The remaining trees should be sought out and spared because of their scientific interest.

TAMARACK (HACMATACK, LARCH). *Larix laricina* (Du Roi), Koch., *L. Americana* Mich.

The tamarack is our only cone bearing tree which drops its leaves in the autumn. It is an attractive, conical tree, its graceful form and full clusters of slender, delicate leaves giving it well-marked individuality. Its deep red fleshy cones, which open in June, resemble flower clusters.



TAMARACK
Branchlet and cone, × ½

The wood is coarse grained but very strong and remarkably durable in contact with the soil. This fact gives it especial value for fence posts, telegraph and telephone poles and railway ties, much of the Vermont tamarack being used for these purposes. It is also used for dock planking.

The tamarack occurs commonly throughout the state. While it is usually found in swamps it is said that it will grow more rapidly when transplanted to dry ground. This fact adds to its desirability for ornamental planting.

THE SPRUCES

Every Vermonter should know and appreciate the spruces. The mountain spruce and the sugar maple are the most characteristic trees of the state. The forests of North America contain seven species of spruce, three of which occur in Vermont.

The spruces are northern trees, and Vermont lies rather south of the belt of their most abundant growth in northeastern America. It is therefore our mountain sides and cool swamps which furnish conditions suitable for their best development.

The flowering cones are similar to those of the pine in general characters. The flowers appear in spring and the cones mature the following autumn, the seeds being shed during autumn or early winter.

Until recently botanists considered the two species, here described as the red and the black, to be simply varieties of one species, which then went under the common name of black spruce. In the lumber trade all three kinds are handled, without discrimination, as "spruce." As a matter of fact, the red spruce furnishes nearly all of the spruce lumber of this state. Spruce gum also comes chiefly from the red spruce, although it is formed by the other species.

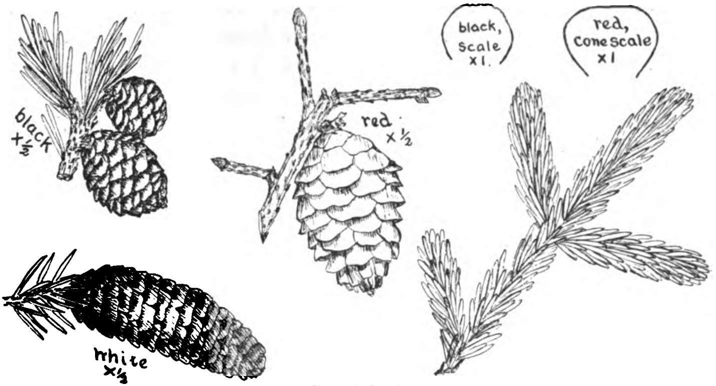
- Branchlets coated with minute hairs.
  - Cones 1-1¼ inches long, clinging to the branches many years; scales of cone toothed at outer margins; leaves blue-green, paler underneath...... ....Black Spruce
  - Cones 1-2 inches long, generally deciduous by the second summer, scales of cone with outer margins not toothed; leaves yellow-green........ ....Red Spruce
- Branchlets without hairs.
  - Cones slender, 1-2½ inches long, leaves blue-green........White Spruce

Introduced species.—The Norway spruce (***Picea excelsa***) is commonly cultivated in Vermont door yards, parks and cemeteries, and is superior to our native trees for such purposes. It is easily recognized by its more pendulous branches and very large slender cones, 5 to 7 inches long.

The Colorado blue spruce (***P. pungens***) is occasionally planted. This is characterized by its beautiful glaucous-blue foliage. The cones are three to five inches long.

BLACK SPRUCE (SWAMP SPRUCE). *Picea Mariana* (Mill.) B.S.P., *P. nigra* Link.

This is the common spruce of the sphagnum (peat moss) swamps of the Champlain valley. It is also common in Essex county and probably occurs similarly in the other parts of the state, but the distribution is not well known because of its confusion until recently with the red spruce. A small, sterile, semiprostrate form occurs on the extreme



SPRUCES

Branch, cones and cone-scales

summit of Mt. Mansfield. (Eggleston.) Under the most favorable circumstances it is never a large tree, rarely reaching a diameter of one foot or a height of fifty feet. It is therefore a less valuable timber tree than either the red or the white spruce.

It has frequently been planted in Vermont as an ornamental tree. This is unfortunate, as the lower branches soon die, making it the least attractive of our native evergreens.

RED SPRUCE. *Picea rubens* Sargent, *P. nigra rubra* Engelm.

This is the common spruce of our mountain forests, the vast green expanse of which suggested the names of both mountain range and state. It is not commonly distinguished from the preceding species and both are known as black spruce. It attains a height of from seventy to one hundred feet and large logs may be three or more feet in diameter. When growing in open fields it often forms a conical head with the branches, especially of the younger trees, brushing the ground. In the more typical development, especially when in crowded forests, the lower branches soon perish, leaving the long naked trunks which the lumberman prizes.

The wood is light, soft and less durable than pine when exposed to the action of the weather. It is largely used for building timber and for clapboards and shingles. Owing to the fact that it imparts no flavor, spruce is used in the manufacture of butter tubs and boxes. Great quantities are consumed in the pulp mills. It is a tree of slow growth, large specimens in the primitive forests being often two hundred to three hundred years old.

The red spruce is frequently planted as an ornamental tree in Vermont, but its slower growth and less symmetrical form make it less desirable for this purpose than either the native white spruce or the Norway spruce.

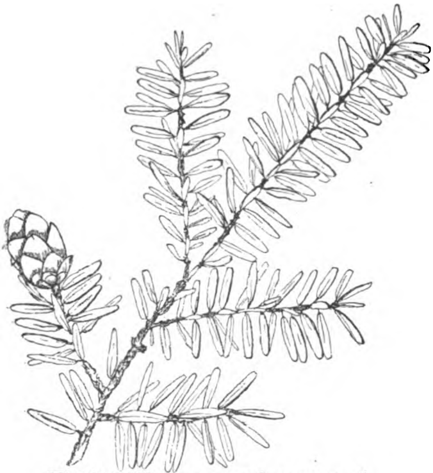
WHITE SPRUCE. *Picea Canadensis* (Mill.) B. S. P., *P. alba* Link.

This is a northern tree, which extends from Canada into northern Vermont. It occurs along the Connecticut river to the Fifteen Mile Falls, (South Lunenburgh), and on the eastern arm of the Y of the Green mountains to the Montpelier and Wells River railroad, or perhaps a little farther south. It is common on some of the islands of Lake Champlain and is scattered through the forests of Essex county. The strong polecat odor of the young branches is characteristic and will aid in its recognition. Because of this odor it is often called skunk spruce. Lumbermen do not separate this from the other spruces and the tree is nearly equal in size to the red spruce.

The white spruce is one of the best of our native evergreens for ornamental planting, as it makes a rapid growth and with its persistent lower branches forms a perfect and symmetrical conical head which rivals the Norway spruce.

HEMLOCK. *Tsuga Canadensis* (Linn) Carr.

The hemlock is one of the most graceful of our evergreen trees. It may be met with almost everywhere from the low river banks and swamps to the rocky hillsides and mountain forests. In distinguishing the hemlock from the spruce and balsam fir, one should notice the flat, petioled leaves arranged in a flattened spray with a row on the upper surface lying close to the stem. The small elliptical cones, scarcely more than three-fourths of an inch long, mature in the autumn and shed their seeds during the winter.

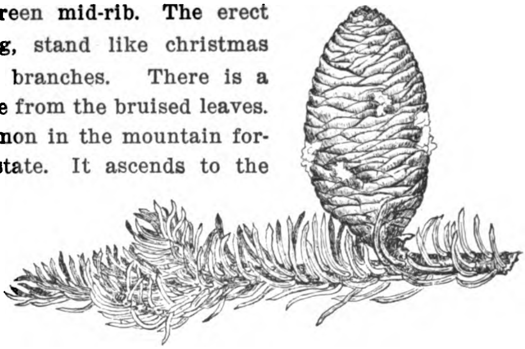

HEMLOCK, spray and cone, x ⅝

The wood of the hemlock is soft, brittle and shaky and it is used for cheaper building purposes and for shingles. It is, however, one of the most durable timbers for use under water. Hemlock bark is used for tanning and the bark from the tree is quite as valuable as the lumber.

BALSAM FIR. *Abies balsamea* (Linn) Mill.

The balsam fir, more familiarly known as the fir tree or balsam, is a slender graceful tree when growing in open ground. It bears a general resemblance to the spruces, but is easily distinguished from them on close observation. The leaves are flat, gray on the under side, with a conspicuous green mid-rib. The erect cones, 2-4 inches long, stand like christmas candles on the upper branches. There is a characteristic fragrance from the bruised leaves. The balsam fir is common in the mountain forests throughout the state. It ascends to the highest summits of Mt. Mansfield and Camel's Hump but is there reduced to a low, scrubby growth.

The wood is light, soft and not durable. It makes a medium quality of shingles.

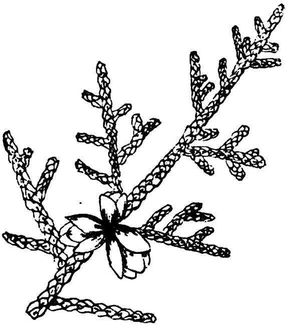

BALSAM FIR

Branchlet and cone, x ½

ARBOR VITAE (WHITE CEDAR). *Thuya occidentalis* Linn.

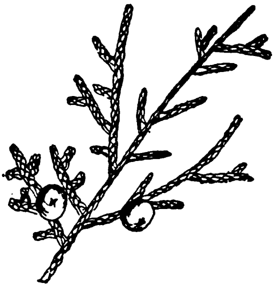
This is a member of the cypress family, and the only one native to this latitude. It is popularly known in Vermont as the white cedar. This is an unfortunate misnomer, since the true white cedar is a different tree of more southern range. The arbor vitæ is easily recognized by its striking pyramidal habit of growth and, upon closer examination, by its small, scale-like leaves, in four rows, but so flattened on the branchlets as to form fan-like sprays.

It occurs commonly in the northern part of Vermont upon cool, moist hillsides and in swamps, becoming less frequent in the southern portions of the state. The bark and fibers twist spirally around the axis, making a shaft of great strength, and the straight slender trunks are of especial value for posts and telegraph poles. Few timbers withstand decay in the soil better than the arbor vitæ, fence posts sometimes lasting thirty or forty years. It is commonly planted for hedges and other ornamental purposes.


ARBOR VITAE, x ⅝

RED JUNIPER (RED CEDAR). *Juniperus Virginiana* Linn.

Three kinds of juniper are found in the state, but this one, commonly known as red cedar, is the only one which has the size and habit of a tree. It occurs on dry, rocky hills, being common along the bluffs of Lake Champlain, less so in the mountain range of southwestern Vermont. It occurs more or less commonly in the Connecticut valley north to Fairlee. (Flint.)



RED JUNIPER, × ⅝

It somewhat resembles the arbor vitæ, from which it may be distinguished at a distance by its less symmetrical form and darker foliage. Closer inspection shows that its scale-like leaves have little tendency to the arrangement in a plane which is characteristic of the arbor vitæ. The fruit is also readily distinguishable from that of the other cone-bearing trees. It consists of thick fleshy scales which coalesce to form a structure looking more like a small berry than a cone, green in midsummer, becoming bluish at maturity in the autumn. The leaves of young shoots are longer than those on the older branches, with needle-like points.

The heart-wood of this tree is soft, red and fragrant, and that obtained from the southern states is largely used in the manufacture of pencils. Most of the Vermont trees are used for fence posts, which are found to be very durable. In some localities of the state oil is distilled from the leaves and wood.

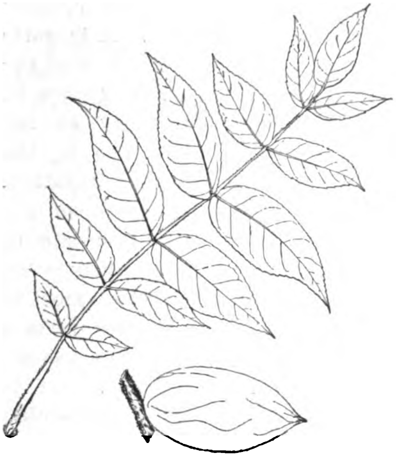
The branches are often loaded with "cedar apples." These are fungus growths and are noteworthy because the spores from them develop as a destructive rust upon adjacent apple trees. Hence red cedars should not be planted near an orchard.

WALNUT FAMILY

BUTTERNUT (WHITE WALNUT). *Juglans cinerea* Linn.

Every school boy in Vermont has some acquaintance with this tree and its sweet tender nuts. It occurs along the hillsides and river valleys throughout the state. The staminate flowers appear in May and hang in graceful, slender catkins five or six inches long. These are generally found on the second year shoots while the fruit-bearing flowers are borne on the terminal shoots. Butternut trees show some irregularities, however, in reference to the time and order of the appearance of the two kinds of flowers so that the pollen-bearing clusters may mature either some ten days earlier or later than the fruit-bearing ones on the same tree. This may be the cause of the variability often noticed in the crop of butternuts. The peculiarity offers an interesting subject for further observation.

The meat of the butternut needs no recommendation but the excellencies of pickles made from the young mucilaginous nuts are not



BUTTERNUT
Leaf and fruit, × ⅛

so well known. For this purpose they should be gathered early in June and the clammy pubesence removed by plunging them into boiling water and rubbing with a coarse cloth.

The wood of the butternut is soft and not strong but takes a beautiful, dark polish and is used especially for interior finishings.

Introduced species.—The black walnut is occasionally cultivated.—It may be transplanted or grown directly from the nuts, and develops rapidly into a beautiful tree, valuable for both its nuts and wood.

THE HICKORIES

The hickories are stately trees, quite generally distributed throughout the United States. There are eight species, all peculiar to America, several of which produce edible nuts. Among the latter are the shellbark hickory in the north and the pecan in the south.

The flowers, arranged in catkins of the two kinds, appear in late spring after the unfolding of the leaves.

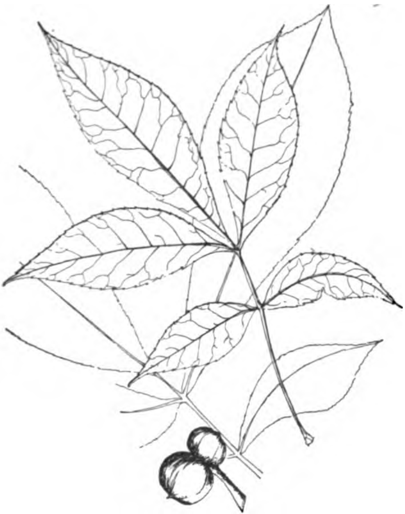
The wood of all these trees is heavy, tough and durable. It is used for axe handles, agricultural implements and in places where strength and elasticity are required it is almost unrivaled.

The hickories are frequently but erroneously termed "walnuts," in the popular language of New England. The true walnuts of which the butternut and black walnut are the American representatives differ from the hickories, although they are closely related.

Nut sweet and edible, bark shaggy, leaflets 5 (rarely 7)..Shellbark Hickory
Nut more or less bitter, not edible, bark close.
    Fruit globular, nut thin-shelled, leaflets 7-11..........Bitternut Hickory
    Fruit pear-shaped, nut hard-shelled, leaflets 5-7........Pignut Hickory

SHELLBARK HICKORY (SHAGBARK HICKORY, WHITE WALNUT). *Hicoria ovata* (Mill.) Britton, *Carya alba* Nuttall.

Two points alone are sufficient to distinguish the shellbark from other hickories; its dark brown bark scaling off irregularly in long slender strips and its compound leaves rarely consisting of more than five

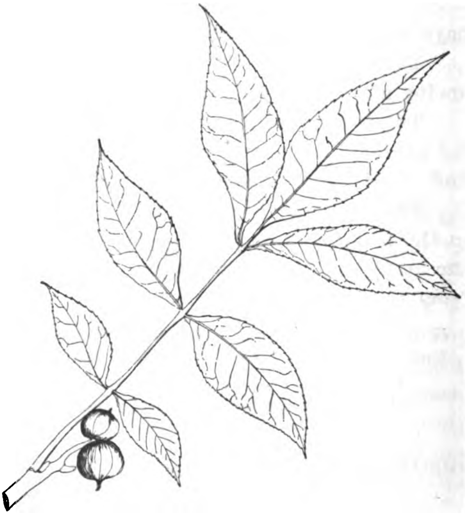


SHELLBARK HICKORY
Leaf and young fruit, × ⅛

leaflets. This is the hickory nut of the markets. It is quite common in the moist soils of the Champlain valley. It occurs in the Connecticut valley as far north as Windsor also in the White river valley at Royalton. There is a large grove on the south side of Bald Mountain in Shrewsbury at an altitude of about 1500 feet. The value of the hickory timber for certain manufacturing purposes has already been mentioned. It is also valued for fuel, yielding more heat to the cord than any other native tree.

BITTERNUT HICKORY (BITTER WALNUT). *Hicoria minima* (Marsh.) Britton, *Carya amara* Nuttall.

Three characteristics of the bitter nut are to be kept in mind in distinguishing it from the pignut, namely, its globular, thin shelled nuts, its small, pointed, yellow buds and its leaves consisting of seven or more slender leaflets. The bitternut does not occur in our mountain forests but is not uncommon with the shellbark in the Champlain and Connecticut valleys. Besides being a desirable ornamental tree, the bitternut produces wood scarely inferior to that of the shellbark hickory for fuel or manufacturing purposes.

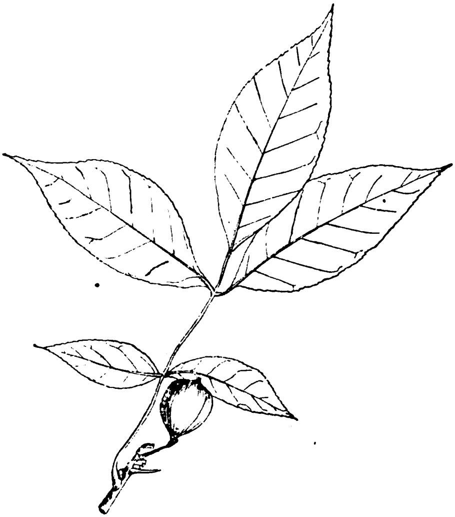


BITTERNUT HICKORY
Leaf and fruit, × ⅛

PIGNUT HICKORY. *Hicoria glabra* (Mill.) Britton, *Carya porcina* Nuttall.

This species is apparently confined to the southeastern and southwestern portions of the state. The following statements summarize the present information as to its distribution. It is a common tree in the Hoosac valley, Pownal, and a large grove occurs on the shore of Lake Bomoseen, West Castleton (Eggleston). There are a few trees near the Hubbardton line in East Castleton (G. H. Ross). In the Connecticut valley it is abundant on the hills near the river in the vicinity of the Massachusetts line, but is not common above Bellows Falls (Flint).

Observers of trees in southern Vermont should strive further to increase our knowledge of its distribution.



PIGNUT HICKORY
Leaf and fruit, × ⅛

In distinguishing this from the bitternut, notice the pear-shape fruit, thick-shell nut, the generally smoother bark and the fewer leaflets, (5-7, rarely 9). It reaches its most northern limit in this region and will probably be found only in the more sheltered river or lake valleys. The lumber of the pignut is of similar value to that of other hickories and is used for like purposes.

WILLOW FAMILY

THE WILLOWS

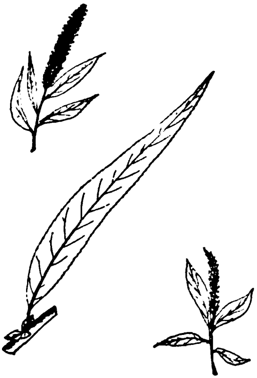
The amateur botanist who tries to distinguish the willows, soon finds himself in an inextricable tangle. This is partly because several European species and varieties have been naturalized and partly because the willows hybridize and rehybridize so frequently. Fourteen native and three introduced species are found in Vermont, only three of which attain the size of trees. The shrubby species vary in height from the common pussy willow (*Salix discolor*) which is sometimes fifteen or twenty feet high and almost a tree, down to the prostrate alpine willows found only under the northwestern slope of the "chin" of Mt. Mansfield, where they raise their heads but a few inches above the moss in which the stems are imbedded.

Willows are commonly introduced as shade trees because they are so easily propagated by cuttings. Care should be taken, however, to select the stamen-bearing trees, both because these are more ornamental when in flower and because they do not produce the downy fruit which is often disagreeable when they are growing near houses.

The following key, while not entirely satisfactory, may aid in recognizing the three tree willows.

Smaller, slender, native trees, bark rough, twigs dark........Black Willow
Larger, spreading, introduced trees.
  Twigs yellow, young leaves ashy-gray or silver-white on both sides........ ....White Willow
  Twigs blue-green, young leaves green above, paler beneath...Crack Willow

BLACK WILLOW. *Salix nigra* Marsh.

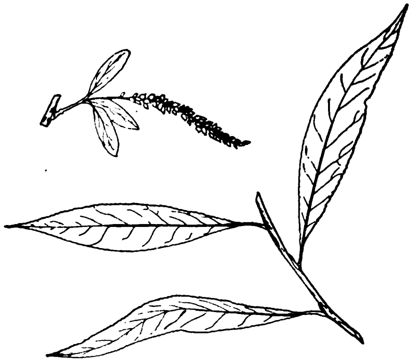


BLACK WILLOW
Leaf and flowers, staminate above, pistillate below, × ⅛

The black willow is a slender, rather graceful tree, common everywhere, along the banks of lakes and streams. It may usually be recognized by its stouter dark brown or black twigs in contrast with the more slender, yellowish or bluish-green twigs of the European species. When the pendulous catkins open, three, five or more stamens may be found in each tiny flower. The leaves are green when mature and smooth except on the mid-veins and petioles.

WHITE WILLOW (YELLOW WILLOW). *Salix alba vitellina* Koch.

The white willow was introduced from Europe, but it has been so commonly planted and is so frequently spontaneous along the banks of streams and lakes, that it merits a place in this list. If one observes closely the tiny staminate flowers in May both this and the next species are clearly distinguished from the black willow since there are but two stamens in each flower, whereas the black willow has from three to six. Usually, however, one must depend upon other and less definite characters. A little practice, following the sug-



WHITE WILLOW
Leaves and pistillate flower, × ⅛

gestions given in the above key, will enable one to distinguish the native black willow from the introduced species. Nor will it be found difficult to distinguish typical trees of the white willow from typical trees of the crack willow by the characters given in this key. As a matter of fact, however, there are numerous varieties and hybrids between these two willows which it is impossible to classify under either name.

The white willow is large and graceful, and this, coupled with the ease of starting it from cuttings, makes it a deservedly popular shade tree.

CRACK WILLOW. *Salix fragilis* Linn.

Most of the statements made in the discussion of the white willow apply to this species also. A distinctive characteristic of the twigs, aside from their color, is that they are very brittle, especially near the base, whence the name.

THE POPLARS

The poplars belong to the willow family and resemble the willows especially in flower and fruit characters. The nodding, worm-like, staminate and pistillate catkins are borne upon different trees and, opening before the leaves, are conspicuous in early spring. The poplars are quite widely distributed, extending from the Artic circle to Mexico and from the Atlantic to the Pacific.

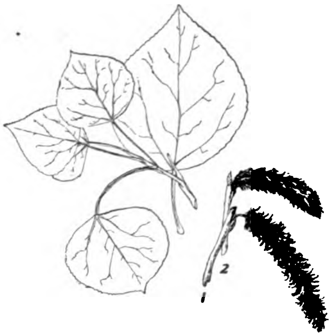
The wood of poplars is very soft and light and especially liable to warp, but is cheap and useful for making toys, boxes and smaller furniture. Much of it now goes to the pulp mills.

- Leaves coarsely and bluntly toothed or scalloped.
  - Leaves roundish, especially at the base................Largetooth Aspen
  - Leaves triangular, with straight or truncate base............Cottonwood
- Leaves finely toothed.
  - Leaves small, nearly as broad as long, petioles much flattened .. American Aspen
  - Leaves larger usually much longer than broad, petioles not flattened........ ....Balsam Poplar

Introduced species.—In addition to these native poplars two European species are very commonly planted, the Lombardy poplar, (*P. nigra Italica*) recognized by its tall spire-like form, and the white poplar, (*P. alba*) easily distinguished by its leaves, green above and very white-cottony beneath.

ASPEN (AMERICAN OR QUAKING ASPEN). *Populus tremuloides* Michx.

The most careless observer cannot have failed to notice the leaves of the aspen continually trembling on the quietest summer day. This tremulousness has, indeed, given name to the species. The reason for it, as may readily be seen by examination of any leaf, lies in the decidedly flattened structure of the leaf-stem or petiole. The slender droop-

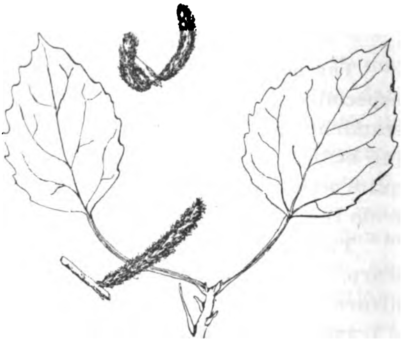


AMERICAN ASPEN
Leaves and flowers,
1 staminate, 2 pistillate, × ⅛

ing catkins appear in early spring and the downy fruits ripen in the latter part of May. The American aspen grows to a medium size, and is the most widely distributed tree in North America, extending from Labrador to Alaska, from Lower California to the Atlantic coast. It is found everywhere in Vermont.

LARGETOOTH ASPEN. *Populus grandidentata* Michx.

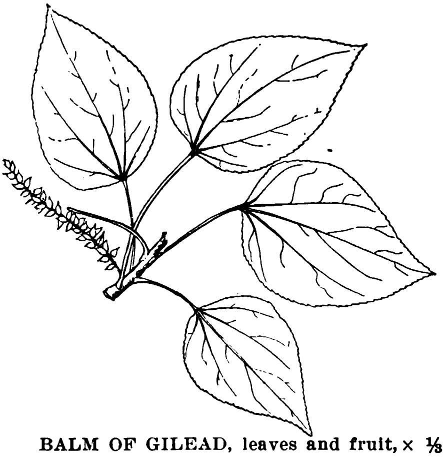
The name of this tree suggests an easy way of identifying it. The coarse toothed margin of the leaf is a constant characteristic and may be relied upon. The pollen-bearing catkins may be seen first, a little later the seed-bearing catkins appear on other trees. The fruits ripen when the leaves are unfolding. The young leaves are downy-white on both sides, but later become green and smooth. The largetooth aspen is of common occurrence in Vermont. It flourishes best on rich sandy soil.



LARGETOOTH ASPEN
Leaves and flowers, pistillate above, staminate below, × ⅛

BALM OF GILEAD (BALSAM POPLAR). *Populus balsamifera* Linn.

This tree, common on the banks of streams and along our roadsides, is a northern species ranging from northern New England far north to the Alaskan coast. It is subject to great variation in the form of the leaves. Some are almost triangular with a deeply heart-shape base, while oth-

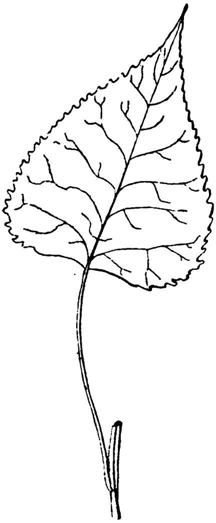


BALM OF GILEAD, leaves and fruit, × ⅛

ers are very slender with a wedge-shape base. The buds and young leaves are covered with a gummy excretion which is sometimes soaked out and used in preparing ointments. It is frequently planted as a shade tree.

A variety of this species (var. *candicans* Gray) has broader leaves, more inclined to heart-shape and minutely hairy on the petiole and margins. It is to be sought along our northern borders and in cultivation.

COTTONWOOD. *Populus deltoides* Marsh., *P. monilifera* Ait.



COTTONWOOD, × ⅛

In Vermont the cottonwood occurs native in the valley of Lake Champlain and along its tributary streams, and south in western Vermont to the Hoosick valley in Pownal where it is particularly abundant. It occurs along the Connecticut river in southeastern Vermont at least as far north as Brattleboro. It has been planted as a shade tree in other localities. For this purpose the stamen-bearing trees should always be chosen since the abundant, cottony, seed is a nuisance near dwellings. The leaves occasionally vary to a heart-shape or even wedge-shape base, but the deltoid (triangular) form is so characteristic as to give name to the species.

The cottonwood is the most massive of our deciduous trees, sometimes 100 feet in height and with a trunk 5 to 7 feet in diameter. Such isolated giants have become the familiar landmarks of many roadsides near Lake Champlain.

BIRCH FAMILY

THE BIRCHES

The birches are widely distributed over the old and the new worlds, being most abundant in the higher latitudes. Nine species occur in North America, four of which are found in Vermont. They are all graceful trees with slender flexuous branches and delicate foliage. Both the fruit-bearing and pollen-bearing flowers are found on the same tree, but in separate clusters. The staminate catkins are long and drooping, while the pistillate are shorter and not pendulous until fruited.

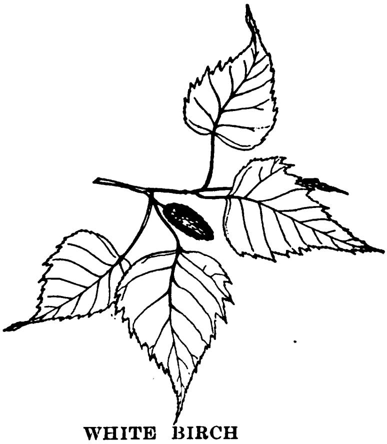
The wood of birches is valued chiefly for cabinet making, for spools and other small articles.

The following key is based largely on the bark characters. It is to be noted that these characters are not well developed on saplings and may be lost on some old trunks.

Bark white.
  Leaves nearly triangular, saw-tooth or lobed, long taper-pointed, bark close.......... ....White Birch
  Leaves ovate, saw-toothed, bark in easily separable layers, often ragged........ ....Paper Birch
  Bark dark brown or black, close, sweet, aromatic............Sweet Birch
Bark silvery yellow, in layers, often ragged...... ....Yellow Birch

Introduced species.—The European white birch (*B. alba*) is commonly planted for ornamental purposes. It is a beautiful tree closely resembling the native white birch. There are numerous horticultural varieties, some with finely cut leaves and pendulous branches.

WHITE BIRCH (GRAY BIRCH). *Betula populifolia* Marsh.



WHITE BIRCH
Leaves and fruit, × ⅛

The white birch is at best but a small, short-lived tree, but it grows in such numbers that it is sure to attract attention. The points which distinguish this birch are its triangular, slender, taper-pointed leaves, smooth-shining on both sides, and its smooth, close, creamy-white bark. Both the staminate and the pistillate catkins open before the leaves in the spring.

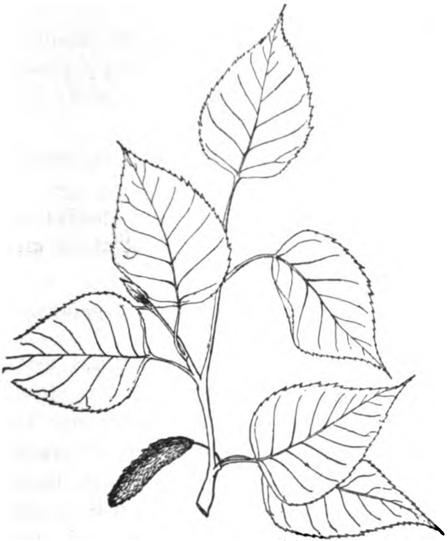
It is most abundant in the lighter soils, either moist or dry in the Champlain valley. It never reaches the higher altitudes, 1800 feet being the highest reported by Dr. Sargent. In the Connecticut valley it is reported by Flint only as far north as Westmoreland, N. H.

It never reaches sufficient size to become a valuable lumber tree, but its light elastic stem is always in demand for spools, shoe-pegs, and barrel-hoops.

The white birch with its white trunk and graceful branches and light, delicate foliage is one of our most beautiful trees, but its desirability for transplanting is lessened by its short life and liability to injury from storms.

PAPER BIRCH (CANOE BIRCH). *Betula papyrifera* Marsh.

The paper birch is found in cool soils in all parts of the state, being typically a tree of more northern distribution than is the last species. It is, however, often intermingled with the white birch and is popularly confused with it, although careful observation reveals many characteristics by which the two may be distinguished. The paper

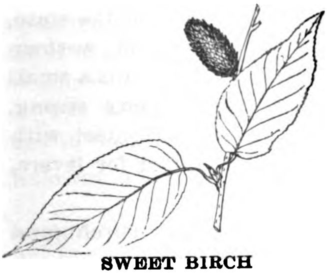


PAPER BIRCH
Leaves and fruit, × ⅛

birch is a larger tree than the white and more widely distributed. The two species are similar in the chalky whiteness of the bark, but that of the white birch clings closely so that it cannot be separated in large layers, whereas the peculiar character of the paper birch is the ease with which ample sheets of the beautiful corky layers may be removed. The larger size of the paper birch makes its lumber more useful for manufacturing purposes than that of the white. A dwarf form known as variety *minor*, which reaches a height of but a few feet occurs on the exposed summit of Mt. Mansfield.

SWEET BIRCH (BLACK BIRCH, CHERRY BIRCH). *Betula lenta* Linn.

The distinctive characters of this tree are well known to many Vermonters, who, as children, have become familiar with the sweet wintergreen flavor of bark and leaves. It is common in western Vermont, but reaches only the foot-hills of the Green Mountains. Its northern limit in the Connecticut valley is in the vicinity of Norwich.



SWEET BIRCH
Leaves and fruit, × ⅛

The two kinds of catkins are noticeable upon the bare trees in winter; and they open on the first spring days, before most other trees have made a visible response to the sun's rays. The wood is hard, strong and valuable for furniture and fuel.

YELLOW BIRCH (GRAY BIRCH). *Betula lutea* Michx.

The polished silvery-yellow bark of the mature tree marks the yellow birch almost as clearly as does the white bark in the case of the preceding species. On the oldest trees in the primeval forest, however, the bark becomes a darker bronze and rough. It is common in nearly all parts of Vermont, but especially in rich, cool soils, and it extends far up the sides of our higher mountains. During the winter the little catkins remain tightly closed, but by June they lengthen into slender, drooping clusters. Yellow birch lumber is valuable for many purposes. It takes a beautiful polish, and is becoming increasingly popular for furniture and for flooring.

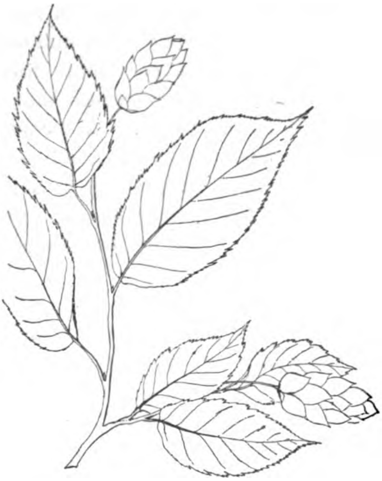
Because of its graceful form and attractive, yellow bark, it merits more general usage for ornamental planting.

The general similarity of the leaves and fruit of this species to those of the paper and black birches, renders further illustration unnecessary.

HORNBEAM (IRONWOOD, LEVERWOOD, HOP HORNBEAM). *Ostrya Virginiana* (Mill.) Koch.

Hornbeams are sometimes mistaken and transplanted for elms, owing to the general similarity in the appearances of the young trees. The leaves of the hornbeam, however, are nearly symmetrical at the base, while those of the elm are more unequally developed. In late summer the hornbeam is easily distinguished by its fruit hanging in hop-like heads.

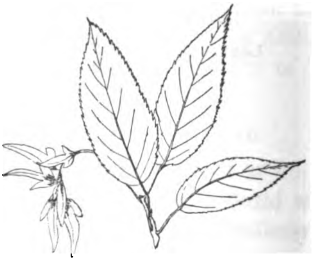
The hornbeam is quite generally distributed, both in the valleys and the mountainous parts of the state, but is most common in western and southern portions. It is a small tree. The wood is very strong, tough, and durable in contact with the soil, hence the names ironwood, leverwood. It is used for levers, mallets and for fencing materials.



HOP HORNBEAM
Leaves and fruit, × ⅛

BLUE BEECH (WATER BEECH, HORNBEAM, IRONWOOD). *Carpinus Caroliniana* Walt.

The blue beech is a small, bushy tree rarely over twenty feet high. It is not uncommon in moist soil along streams, but does not reach the higher altitudes. It is distinguished in spring by its tiny flowers arranged in loose racemes and in July by the curious leaflike wings which develop upon the fruit. A glance at its trunk makes its

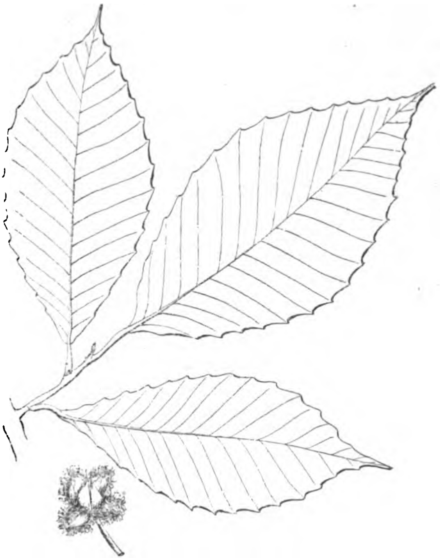


BLUE BEECH
Leaves and fruit, × ⅛

recognition certain at any time of year, however. This has a close, gray bark resembling that of the beech but with furrows and ridges suggesting the muscles of a strong man's arm. It is the toughest of all our woods.

OAK FAMILY

BEECH. *Fagus Americana* Sweet, *F. ferruginea* Ait.



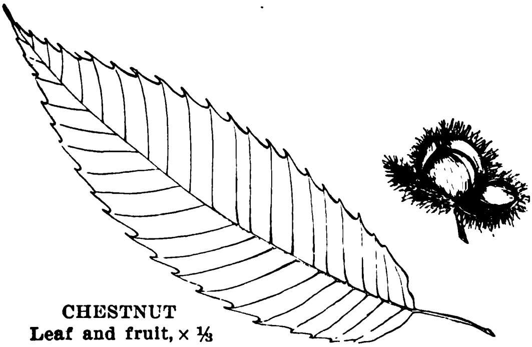
BEECH
Leaves and fruit, × ⅙

The beech, when growing in the forest, with its tall, graceful trunk, its smooth, gray bark and shiny leaves, is a handsome tree. It is not only one of the most common trees in Vermont, but also one of the most widely distributed in eastern North America.

The drooping clusters of pollen-bearing flowers and the short, stout fruit-bearing heads open under the newly spreading leaves in early May. The burs open and the nuts fall with the first frosts of autumn. There is a popular saying that beech nuts occur plentifully only once in seven years. There certainly is great irregularity in the fruiting of the beech. What is the reason? This is an interesting question for some one to investigate.

The wood is quite hard and makes the best of flooring. It is also used in the manufacture of bench planes and similar tools and for fuel.

CHESTNUT. *Castanea dentata* (Marsh) Bork., *C. sativa Americana* Wats.



CHESTNUT
Leaf and fruit, × ⅙

Unfortunately the chestnut is not found in most parts of the state. It occurs in southeastern Vermont along the Connecticut valley as far north as Windsor. In the southwestern part of the state it is found well scattered in the Taconic range from

Pownal to Manchester. A grove occurs at West Rutland and there are native trees upon Rock Point near Burlington. This is the most northern station in New England. The chestnut will probably grow in all parts of the state and may well be cultivated both for its delicious nuts and for its beauty as a shade tree.

The leaves are shiny and graceful, from six to eight inches long. When they are nearly grown, long, stiff catkins of fragrant, greenish-yellow flowers appear. These bear the pollen, the fruit-bearing flowers being smaller, enclosed in bur-like scales. The nuts, two or three in a bur, ripen in October.

THE OAKS

The oaks, abundant throughout the northern hemisphere, are remarkable for their massive trunks, for their thick, rugged bark and large, strong roots. They are distinguished from all other trees by their cupped fruit, but many who have seen these fruits have not noticed the small, scaly masses of flowers which produce them. The pollen-bearing flowers are found on the same tree, but are arranged in long, slender catkins consisting of a cluster of from three to twelve stamens. Some of the oaks, including the red and black, do not mature their fruit until the second year.

Oak timber is of great commercial value, being used for a variety of purposes. For strength, toughness and durability combined, it is unsurpassed.

The oak genus is a large one. Ten species are known to occur in Vermont, and these sometimes hybridize, producing intermediate forms. The bear oak or scrub oak, *Q. nana* (Marsh.) Sarg., is a straggling shrub, occurring sparingly in southeastern Vermont. The dwarf chinquapin oak, *Q. prinoides*, Willd., is also a rare shrubby species; dry hillsides, Pownal (Robbins, Eggleston), Weybridge (Brainerd). The other eight species are trees. Of these three are rare or local in their occurrence, as follows:

Chinquapin oak, *Q. acuminata* (Michx.) Sarg., (*Q. Muhlenbergii* Engelm.), Gardiner's Island, Lake Champlain (Pringle).

Bur oak, *Q. macrocarpa* Michx., in the Champlain valley, more common in Addison county than elsewhere.

Scarlet oak, *Q. coccinea* Wang, Pownal (Eggleston).[1]

The other five are of more common occurrence; the following key will aid in distinguishing them.

- Lobes of leaves obtuse, not bristle-pointed, fruit annual.
  - Leaves usually deeply lobed (½- or ⅔-way to midrib)........White Oak
  - Leaves scalloped or shallow-lobed (less than ⅓-way to midrib), stalk of acorn much longer than leaf-stalk........Swamp White Oak
  - Leaves undulate-toothed (crenate), stalk of acorn shorter than leaf-stalk........ ....Chestnut Oak
- Lobes of leaves acute, bristle-pointed, fruit biennial.
  - Acorn large, cup ¾-1 inch broad, shallow, saucer-shaped........Red Oak
  - Acorn small, cup ½-¾ inch broad, hemispherical or top shaped..Yellow Oak

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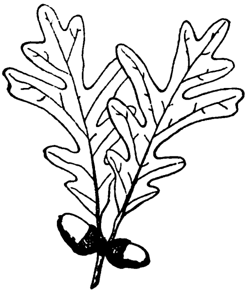
[1] Mr. Eggleston writes just as this matter is going through press that this Pownal oak proves on more careful examination to be only a deeply lobed form of the yellow oak.

UNIVERSITY OF CALIFORNIA

WHITE OAK. *Quercus alba* Linn.

The white oak is the most beautiful as well as the most useful of the oaks found in this part of the United States. Vermont has quite a generous supply of these trees in the Champlain valley. Flint states that it occurs but sparingly in the southern Connecticut valley and disappears before the mouth of the Passumpsic is reached. Both kinds of flowers appear at the same time, the staminate being more conspicuous on account of their drooping clusters. The acorns ripen and fall during the first autumn.



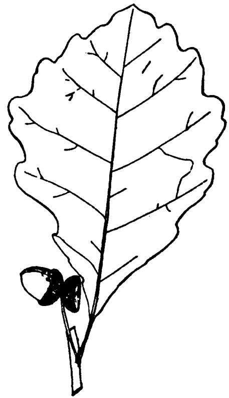
WHITE OAK
Leaves and fruit, × ⅛

The tough, heavy wood of the white oak needs no recommendation. On account of the beauty of its grain and its capability of taking a high polish, it is extensively used for furniture and for inside finishings. It is also much used in carriage manufacture and for car and bridge timbers.

The famous "Charter Oak" of Connecticut was of this species.

SWAMP WHITE OAK. *Quercus platanoides* (Lam.) Sudworth, *Q. bicolor* Willd.

In beauty and variety of grain this tree nearly equals the white oak and its wood is valuable for similar purposes. As its name suggests it grows in low, moist soil. Unfortunately the swamp oak is not found in Vermont except along the intervales of Lake Champlain and its tributaries. Here it is quite abundant and its majestic size and symmetrical, rounded top make it a conspicuous and beautiful tree. It is more easily identified than many of the oaks because of the scaly bark, the leaves downy on the lower surface and the long, downy stalks of the acorns. The flowers open late in May and the fruits ripen the following autumn.



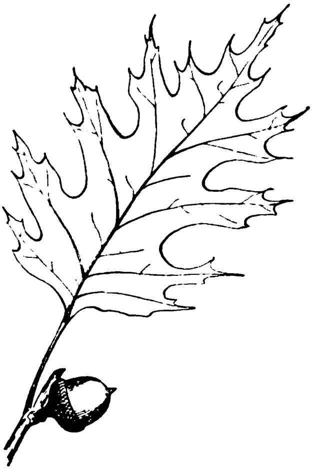
SWAMP WHITE OAK
Leaf and fruit, ×⅛

CHESTNUT OAK. *Quercus prinus* Linn.

The popular name of this oak is suggested by the marked resemblance of its leaves to those of the chestnut. It is one of the common oaks from Massachusetts and New York southward, forming a large tree on rocky hillsides, often associated with the chestnut. The line of its northern distribution passes through the Champlain valley. It is common on Snake mountain and the quartzite range of the Green mountains in Addison county (Brainerd) and thence south through Rutland and Bennington counties. It probably occurs in the southeastern part of the state also.

The acorns are large, one inch or more in length. The wood is hard and tough and is frequently used for railroad ties.

RED OAK. *Quercus rubra* Linn.

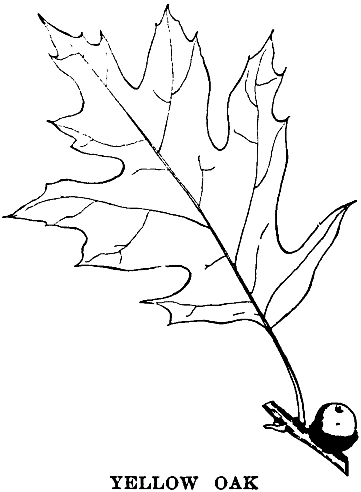


RED OAK
Leaf and fruit, x⅛

The red oak is the most northern of all the oaks, ranging from Nova Scotia to Tennessee. It is generally distributed through the Champlain and lower Connecticut valleys where it is the most common oak. It is less common in the northern part of the Connecticut valley. The flowers appear in May but the sessile, shallow-cupped acorns do not ripen until the second autumn.

The wood is lighter in weight and more brittle than that of the white oak but when quartered shows a beautiful grain and is used for furniture. It is also valued for bridge posts where there is to be exposure to water. The wood drys out slowly and is inferior as fuel.

YELLOW OAK (BLACK OAK). *Quercus velutina* Lam., *Q. coccinea tinctoria* Gray.



YELLOW OAK
Leaf and fruit, x⅛

The yellow oak is a southern species which reaches its northern limit in Vermont. It is not uncommon in light, dry soils in the Champlain valley and it occurs also in the southern part of the Connecticut valley. The two common and apparently incompatible names, yellow oak and black oak, arise from the diverse colors of the inner bark and the outer bark. The former, which is used in tanning, is yellow, while the latter is very dark. The leaves are rather large, dark, shiny green with yellowish petioles. The acorns do not ripen until the second autumn. The wood is hard and tough like that of the white oak and is used in manufacturing.

ELM FAMILY

THE ELMS

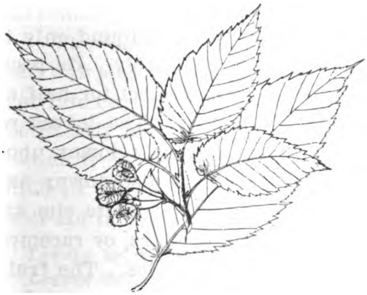
We are fortunate in having in Vermont all of the elms of the eastern United States except one small southern species. The tiny greenish flowers have no petals but gracefully fringe the bare trees with their long, slender stamens in early spring before the appearance of the leaves. The fruits are supplied with a disk-like membranous wing. The leaves of all the elms have a peculiar oblique base, full and rounded upon one side, sharply wedge-shape on the other.

The three native species are readily distinguished as follows:

- Inner bark mucilaginous...Slippery Elm
- Inner bark not mucilaginous.
  - Branchlets with corky wings.......................................Cork Elm
  - Branchlets without corky wings....................................White Elm

Introduced species.—The English elm has occasionally been planted as a shade tree, although for such purposes it is less stately than our common white elm. Two European varieties have been more used for ornamental plantings, though each of them is rather curious than ornamental. These are the corky variety of the English elm, and the Camperdown or weeping elm, which is a variety of the Scotch elm. The young branches of the former are covered with conspicuous corky outgrowths, similar to those of the native cork elm, but more strongly developed. The American cork elm is distinguished from the English by its more downy bud-scales and by the production of flowers in elongated clusters (racemes), whereas those of the English elm are in close clusters. Other differences will readily be detected by those having occasion to compare the two trees. The weeping elm is usually grafted on an upright stock, leading to a peculiar umbrella-like development.

WHITE ELM (AMERICAN ELM). *Ulmus Americana* Linn.



WHITE ELM

Leaves and fruit, × ⅛

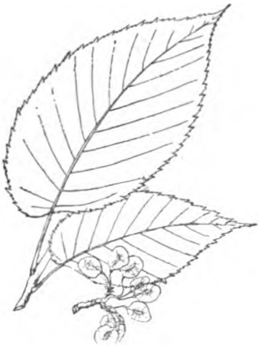
Of all the native trees none has done more than the white elm to beautify the streets of our cities and villages, or to grace our country hillsides and meadows. The spreading vase-shaped head is its typical form, but perfect trees are only found where there has been a free development of the branches from the sapling age. Even when developing freely, however, the trees vary markedly in form. Some may be found which are very strict and upright; others which are straggling and strongly weeping. The bark characters also vary much in different trees. Numerous clusters of slender, drooping flowers open before the leaves in early May, giving the tree a delicate feathery appearance. The seeds mature and fall before the leaves are fully grown.

The wood is very tough and fibrous, making is useful for ox yokes, wagon bolsters, hubs of wheels and similar purposes where there is special cross-strain.

SLIPPERY ELM (RED ELM). *Ulmus pubescens* Walt., *U. fulva* Michx.

The slippery elm is not uncommon in Vermont. The scattering trees of this species are, however, usually passed unnoticed because it so closely resembles the American elm that it is not easy to distinguish the two by general appearance. The stringy mucilaginous bark of the slippery elm is always a sure means of recognition.

Other means of distinguishing it are found in its circular fruits, which appear in May; these have smooth margins, whereas those of both the other species are fringed with delicate hairs. The leaves are larger, rougher above and soft-downy beneath. But the surest and simplest test is the "slippery" bark. This has well known medicinal properties which give it a recognized value in the drug trade. The slippery elm prefers rocky ridges and hillsides.



SLIPPERY ELM
Leaves and fruit, × ⅓

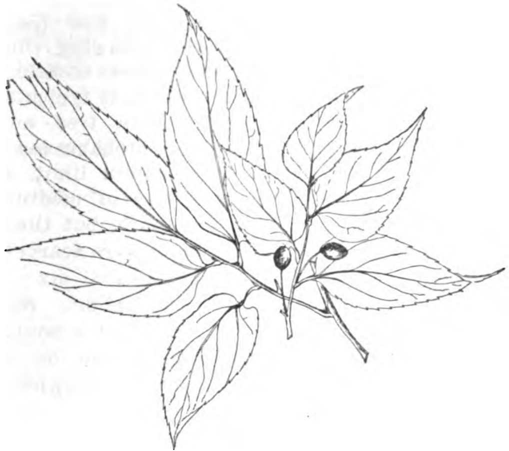
CORK ELM (ROCK ELM). *Ulmus racemosa* Thomas.

The cork elm is a more valuable timber tree but it is found only in the limestone soils of western Vermont and there but rarely. Its peculiarity is a growth of corky ridges which sometimes project for half an inch or more from all sides of the younger branches. The leaves resemble those of the white elm but are more conspicuously downy upon the under side along the mid-ribs. The bud scales are also downy and the young branchlets somewhat so whereas those of the white elm are smooth. The flowers are borne in open branching clusters, or racemes, and this characteristic gives the Latin name to the species. The fruit, which matures when the leaves are half grown, is somewhat larger than that of the other elms.

HACKBERRY (NETTLETREE). *Celtis occidentalis* Linn.

The hackberry is one of the rare trees of this state, occurring so far as known only sparingly in the river bottom lands of the Champlain valley and the southern Connecticut valley. Its berries are dark purple when ripe and may remain on the tree all winter. They are about the size of peas, with a sweet flesh which is edible, and sought by the birds. Its fine form makes it a desirable shade tree.

It so closely resembles the elms that it is easily mistaken for one of them and because of this it is doubtless frequently passed unnoticed even by botanists.



HACKBERRY

Leaves and fruit, × ⅛

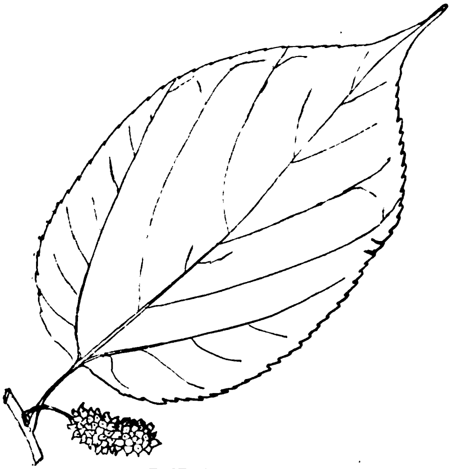
MULBERRIES

The name mulberry is very commonly applied in Vermont to one of the wild raspberries, which has a conspicuous rose-like blossom followed by a reddish raspberry fruit. This shrub should be called the purple flowering raspberry since the true mulberries are trees. Two species of mulberry occur in Vermont; of these, the red is native, and the white is introduced.

The fruit of both is edible somewhat resembling that of the blackberry in size and appearance. The leaves are heart-shape or ovate, often cut into curiously irregular lobes so that no two leaves on a branch will be exactly alike. This irregularity in leaf-form, together with the peculiar fruit, makes the recognition of the mulberry easy. It is often difficult to distinguish the two species, however. The following key will aid in this:

Leaves bright and smooth, mostly glossy above............White Mulberry
Leaves dull green, upper surface rough.....................Red Mulberry

RED MULBERRY. ***Morus rubra*** **Linn.**



RED MULBERRY
Leaf and fruit, × ⅜

The red mulberry was discovered at Pownal in southwestern Vermont by Wm. Oakes some seventy years ago. W. W. Eggleston recently found a few trees near Pownal showing that it still occurs there occasionally at least. It is typically a more southern tree and this station is probably nearly at its northern limit. It becomes a tree of medium size at the south, but these Pownal plants were scarcely more than shrubs, six to fifteen feet in height. Students of trees in the southern counties should be on the lookout for it elsewhere.

WHITE MULBERRY. ***Morus alba*** **Linn.**

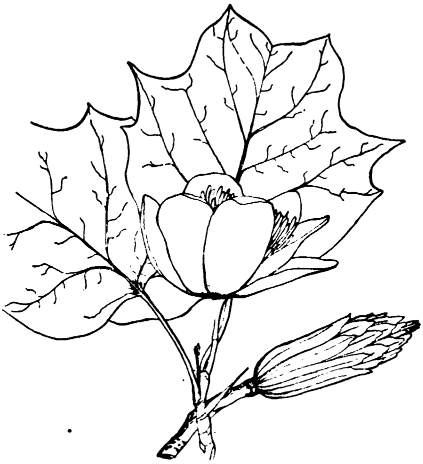
Some years ago there was considerable discussion and some experiments upon the feasibility of silk-worm culture in the United States. At this time the white mulberry was planted in many places in the state. These trees have proved hardy and occasionally spontaneous seedlings have appeared.

MAGNOLIA FAMILY

TULIPTREE.

Liriodendron tulipifera **Linn.**

The tulip tree is included in this list of native Vermont trees, although few native trees can be pointed out. The tree was authentically reported in the Appendix to Thompson's Vermont in 1853. It then occurred occasionally in Bennington county along the Hoosick valley A single native specimen of it was recently reported from North Pownal by Eggleston, showing that it is not yet extinct. It is to be hoped that tree



TULIPTREE
Leaves, flowers and fruit, × ⅓

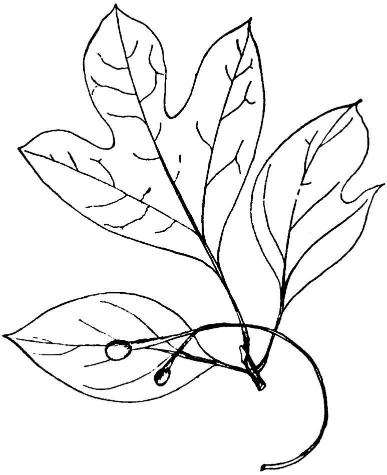
lovers located in that portion of the state will learn and more fully report upon its present distribution as this region marks its northern limit as a native tree. It thrives, however, as a shade tree planted in yards in Rutland and Burlington.

An attractive feature of this tree is its display of tulip-like flowers which open in June. The leaves are curiously four lobed, or lyre shape, as is well shown in the figure, light green above and whitish below.

LAUREL FAMILY

SASSAFRAS. *Sassafras Sassafras* (Linn.) Karst., *S. officinale* Nees.

The sassafras reaches its northern limit in southeastern Vermont where it occurs sparingly in sandy soils in the lower Connecticut valley. It is also found in Pownal, and should be looked for further north in western Vermont. The leaves have many interesting variations in form. Some are ovate and entire while others are deeply three lobed. These with intermediate forms may be found on the same tree. Its bright blue fruits ripen in September and are eagerly devoured by the birds. The root of this tree furnishes the sassafras bark of commerce. When transplanted it makes an interesting and rather ornamental tree.



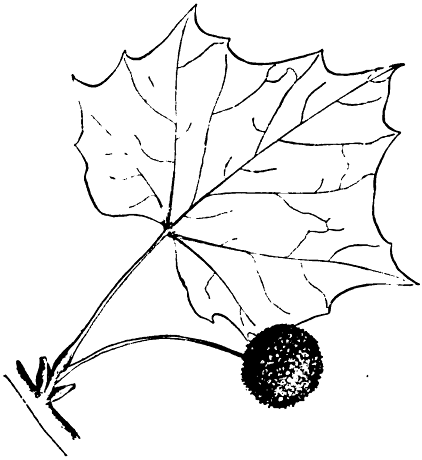
SASSAFRAS
Leaves and young fruit, × ⅛

PLANETREE FAMILY

SYCAMORE (BUTTONWOOD). *Platanus occidentalis* Linn.

The sycamore occurs sparingly in the Champlain and the lower Connecticut valleys, and their tributaries. It is also abundant in the Hoosac valley, in southwestern Vermont. It is at its northern limit in this state and as a consequence no very large trees of it occur. In the lower Ohio and Mississippi valleys, where it is more fully at home, the sycamore develops into the largest tree of eastern North America, occasionally reaching a height of 150 feet and a diameter of 15 feet.

An unmistakable character of the tree is its bark. On old trees this is brown and rough on the lower parts of the trunk, but above and on the branches it is smoother with great irregular whitish or pale yellowish patches where the outer layers have scaled off leaving the inner bark



SYCAMORE
Leaf and fruiting head, × ⅓

exposed. This gives the tree a whitewashed appearance when seen from a short distance.

The globular heads of fruit or "buttons" swing by their slender stalks until late in winter. The wood is hard and durable for many purposes. On account of its beauty and delicacy of color it is used for furniture, and inside casings.

It is a water loving tree, preferring the low, rich banks of streams, but will grow in drier soils. It is frequently planted as a shade tree. It is interesting and sometimes picturesque, but rarely ornamental as it grows in Vermont.

ROSE FAMILY

THE MOUNTAIN ASHES

The mountain ashes are conspicuous among our trees for their broad, flat-topped clusters of creamy-white flowers followed by the persistent scarlet fruits. The common name is suggested by the general resemblance of the compound leaf to that of the ashes. In reality these trees are very closely related to the cultivated apples and pears, a fact which will become evident if one examines the structure of either the flower or the apple-like fruit.

Two species of mountain ash are natives of the elevated parts of the eastern United States and both of these occur in Vermont. They are closely related and so similar that it requires careful scrutiny to distinguish them.

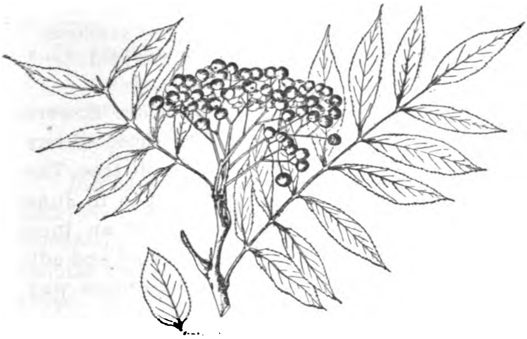
Leaflets with long tapering points, leaf-buds smooth, fruit ⅙ to ¼ inch in diameter.......... ....American Mountain Ash
Leaflets broader more bluntly and shorter pointed, leaf-buds sparingly hairy, fruit larger (⅓ inch in diameter)....Elderleaf Mountain Ash

Introduced species.—The native mountain ashes are not infrequently transplanted. The one most commonly used for ornamental purposes in Vermont, however, is the European mountain ash (*P. Aucuparia*). Plants of it are found abundantly spontaneous in groves at Burlington, evidently from seeds carried thither by birds. It is easily distinguished from either of the native species by the fact that its younger leaves are distinctly pubescent, with fine hairs on both surfaces, whereas the leaves of the native species are nearly or quite smooth. Both the flowers and fruits of the European species are larger than those of the native.

There are several varieties of this or other European species in cultivation, including one that has pendulous or weeping branches, and one with leaves that are usually simple or divided only at the base, the oakleaf mountain ash.

AMERICAN MOUNTAIN ASH. *Pyrus Americana* DC.

This is the more common native species. It is a small tree twenty-five to thirty feet high, scattered over the state but more frequent in the mountainous regions. The large flat clusters of whitish flowers open before the leaves are fully expanded. The leaf and fruit characters are well shown in the accompanying drawing. In color the fruit is bright red, and renders the trees especially conspicuous and attractive in autumn and early winter.



MOUNTAIN ASHES
Leaves and fruit of the American and one leaflet of the elderleaf, × ⅛

ELDERLEAF MOUNTAIN ASH. *Pyrus sambucifolia* Cham. & Schl.

This species is found near the summits of Mt. Mansfield, Camel's Hump, Willoughby and a few of the other higher mountains. It is not very common anywhere. This is not surprising since it is a northern tree and reaches its southern limit in New England, extending from here northward to Greenland and westward to the Rocky Mountains and Alaska. It is a small tree, or often a mere shrub when not favorably situated, with branches spreading into a rounded head. Sargent says that it reaches its best development in this region. It has been transplanted occasionally in northern Vermont and has made a beautiful small shade tree.

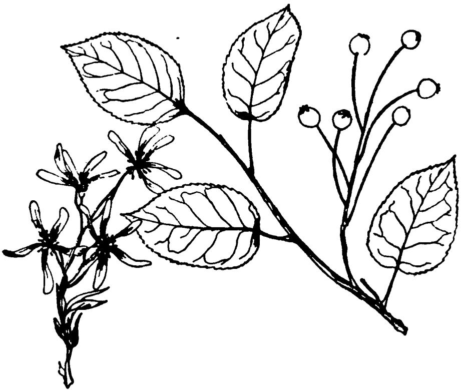
The leaflets are seven to thirteen in number. One of them is included with the illustration of the American mountain ash that the two kinds may be compared. It will be seen that the elderleaf is shorter and broader with a tendency to be less pointed or even blunt at either end. It occurs so rarely, however, that there will be little opportunity for confusion between the two except by mountain climbers.

APPLES AND PEARS

The cultivated apples and pears are so closely related to the mountain ashes as to be placed by most botanists in the same genus with them. They are all introduced from Europe and Asia. The apple (*Pyrus Malus*) is frequently spontaneous, and many of the best varieties under cultivation in this country came from such American seedlings. The common pear (*Pyrus communis*) and the crab apple (*Pyrus baccata*) are both near relatives of the apple. Some of the larger improved varities of the crab are probably hybrids with the common apple.

SERVICEBERRY (SHADBUSH, JUNEBERRY). *Amelanchier Canadensis* (L.) Medic.

The shadbush is easily recognized by its graceful white flowers which appear in the most lavish profusion in May before those of any other native fruit tree. The fruits which ripen in June are a quarter of an inch long, purple, sweet and edible but the birds make way with them so quickly that they are not often to be found.



SERVICEBERRY
Leaves, flowers and fruit, x ⅓

The shadbush is common in light soils and dry woodlands throughout the state, and especially so in parts of the Champlain valley.

It ranges in size and habit from a bush to a small tree of twenty to thirty feet. Like the other members of this family it is variable and there are also some smaller shrubby species[1] which very closely resemble it. Some of these are being cultivated for their fruits, and are said to be quite productive and desirable.

HAWTHORNS

The haws, or as they are more familiarly known, the hawthorns or thornapples, have characters which render them conspicuous and familiar to everyone. They are all small trees, often shrubby in habit, with low crowns and spreading branches. These are usually covered in spring with clusters of attractive white flowers and loaded in autumn with fruit, which is apple-like, varying in color from red to yellow and in diameter from one-fourth to three-fourths of an inch or more.

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[1] "Probably six species, as follows: *A. Botryapium, A. oligocarpa, A. alnifolia, A. rotundifolia, A. spicata,* and an undescribed species." (W. W. E.)

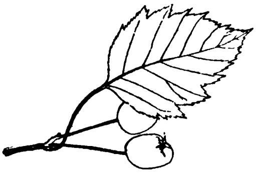
Several species of haw occur in this state. They are extremely variable and, indeed, are not at present fully understood by botanists. For this reason only the three most common and well marked species are included in the following key and descriptions.[1]

Branches horizontal, gray, leaves wedge-shape at base, fruit yellow or red...... ....Dotted Haw
Branches not horizontal (irregularly ascending), reddish.
  Leaves thin, usually rounded or heart-shape at base, leaf-stalk slender, fruit coral-red..... ....Scarlet Haw
  Leaves thicker, shining, wedge-shape at base with leaf-tissue often extending down the short, stout leaf-stalk, fruit bright, dark red....... ....Longspine Haw

Introduced species.—In addition to these three species and the other natives ones mentioned in the foot note, the English hawthorn (*Crataegus Oxycantha*) is often met. This has been planted as an ornamental tree and is sometimes found as an escape in woods or by-roadsides. It is to be distinguished by its smaller fruit (one-fourth to one-third inch long) and distinctly cut-lobed leaves, wedge-form at the base. The flowers are large and showy.

SCARLET HAW (SCARLET-FRUITED THORN, WHITE THORN). *Crataegus coccinea* Linn.

The scarlet haws (including the various forms, see foot note) are the commonest of our hawthorns and are certainly well known to the children of Vermont, for who has not at some time or other eaten thorn apples or woven caps with the sharp slender thorns? The white or pinkish flowers open in early June and are among the most beautiful found upon any tree. The scarlet apples are oblong and about half an inch in diameter. They ripen in September or October and often hang upon the trees until late fall. The scarlet haws are generally distributed through the lower altitudes in Vermont.


SCARLET HAW.
Leaf and fruit, ×⅛

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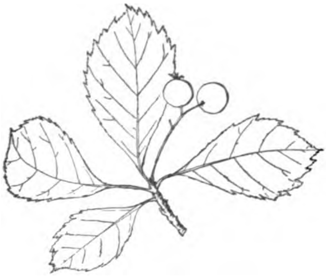
[1] Professor Sargent has recently made a critical examination of specimens of Vermont hawthorns sent him from various localities. Reports on these just as this is going to press indicate that a considerable revision of the botanical conception of some of the species is necessary. He distinguishes ten species among those submitted to him, as follows: *C. coccinea, C. macracantha, C. flabellata, C. intermedia, C. rotundifolia, C. populifolia, C. mollis, C. glandulosa, C. punctata, C. Crus-galli.* All of these except the last two are forms of what is included in Gray's Manual under *C. coccinea* and its varieties.

It is evident, therefore, that the hawthorns will present some interesting and perhaps rather puzzling questions to any one who undertakes careful observations upon them.

LONGSPINE HAW. *Crataegus macracantha* Loud., *C. coccinea macracantha* Dudley.

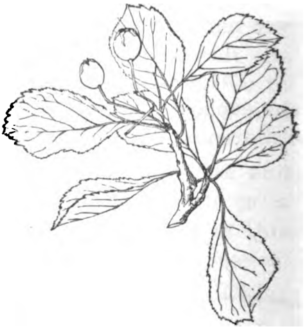


LONGSPINE HAW
Leaves and fruit, × ⅛

This hawthorn is common in the Champlain valley and occurs in the Connecticut valley. It may therefore be expected along with the scarlet haw in most parts of the state. It closely resembles the scarlet haw in general appearance, but has spines somewhat longer, flower larger and borne in broader, stouter clusters. The fruit is rather smaller, round or compressed longitudinally. It is difficult to distinguish the species by these characters alone, however, and it will usually be necessary to appeal to the leaves in its indentification. These are shining, thicker and more leathery in texture than those of the scarlet haw and have a wedge-shape base merging into a rather short stout petiole. A comparison of the figures will help make these distinctions clearer.

DOTTED HAW (SPREADING THORN, DOTTED FRUITED THORN). *Crataegus punctata* Jacq.

The dotted haw is a curious looking tree with stout branches spreading nearly at right angles to the trunk and forming a broad flat or terraced head. This character is more clearly seen in the older trees and when viewed from a short distance. Its identification may be made more certain by comparing the form of the leaves with the accompanying figure and also by noting the fruit characters. The fruits are larger than those of the scarlet haw, sometimes nearly an inch in diameter, turning dull red or yellow in autumn and marked with whitish spots. This last character has given name to the species. The dotted haw thrives best on rocky upland pastures and is not uncommon throughout the state.



DOTTED HAW
Leaves and fruit, × ⅛

A form of these species (var. *canescens* Britton) has been found at Ferrisburg, which is densely whitish tomentose (hairy) on the lower leaf surfaces, and on the leaf and fruit stalks.

THE PLUMS AND CHERRIES

The plums and cherries, particularly when in blossom, are among the most attractive trees in New England. They are all of small or medium size with conspicuous pink or white flowers. They are distinguished by their stone fruit and by their astringent bark and leaves.

There are five species found in Vermont. One of these, the sand cherry, is a small shrub usually nearly or quite prostrate and is found but rarely. One of the other four, the choke cherry, seldom attains to the size or habit of a tree, but it is deemed best to include it in this list since it occurs so commonly along with the tree species that the omission might lead to some confusion.

Fruit red or yellow, flowers and fruit in short spreading clusters (umbel-like).
  Fruit small, ⅓ inch or less in diameter, bright red, small slender tree, bark light red-brown, leaves finely saw-toothed......Wild Red Cherry
  Fruit large, ½ inch or more in diameter, red or yellow, small tree, branches spreading, bark rough and dark gray, leaves coarsely saw-toothed..Canada Plum
Fruit black, flowers and fruit in long, slender clusters (racemes), bark grayish.
  Shrub, fruit very astringent, leaves sharply saw-toothed......Choke Cherry
  Large tree, bark rough and black, fruit slightly astringent, leaves with teeth incurved...Black Cherry

Cultivated species.—There are several species of plums and cherries in cultivation. Those oftenest found in Vermont are the following:

European or garden plum. *Prunus domestica* Linn. The common cultivated plum, including the Damsons, (the latter being var. *Damascena*). Tree strong, usually upright; leaves large, ovate or obovate, firm, thick, rough, coarsely saw-toothed.

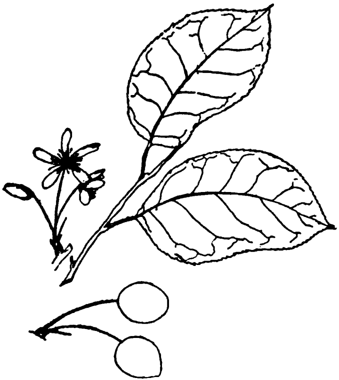
Japanese plum. *P. triflora* Roxb. A more slender willowy tree, with smoother, greener leaves, more finely cut-toothed.

Sour cherry. *P. Cerasus* Linn. The commonest cultivated cherry in Vermont. A comparatively small tree with smooth leaves; fruit sour.

Sweet cherry. *P. Avium* Linn. A larger, straighter growing tree, seldom seen in Vermont; leaves larger, dull and soft; fruit usually sweet.

Other species sometimes cultivated are the following plums: *P. Simoni*, *P. cerasifera*, *P. Americana*, *P. augustifolia*, *P. hortulana;* the peach, *P. Persica;* and the apricot, *P. Armeniaca.*

CANADA PLUM (WILD OR HORSE PLUM). *Prunus Americana nigra* Waugh, *P. nigra* Ait., *P. Americana* Marsh. in part, according to Gray's Manual.

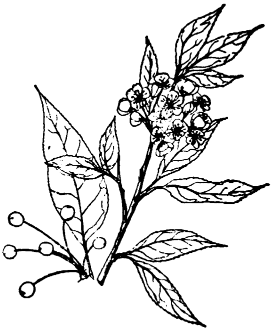


CANADA PLUM.
Leaves, flowers and fruit, × ⅓

The Canada plum, found frequently in Vermont, is a small tree or shrub, with grayish-brown bark and short, spiny branchlets. It may be recognized by its broad coarse leaves, sometimes four inches long and two or three inches wide. The flowers are abundant, large and strong, of a fine pinkish color, and appear about the first week in May. The fruit, often an inch in diameter, ripens in August. It is sometimes rather bitter, but occasional trees bear good eatable fruit.

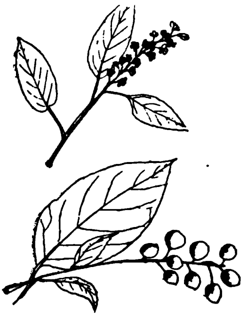
WILD RED CHERRY (BIRD CHERRY). *Prunus Pennsylvanica* Linn.

The wild red cherry, a small, slender tree, is quite generally distributed from the rocky woods of Newfoundland to North Carolina. It is common in all parts of Vermont where it is often only a roadside shrub. The flowers appear in May in beautiful white clusters on long pedicels. The fruit, which ripens in midsummer, is small and globular, becoming bright red when mature. This tree is distinguished from the other cherries by its slender and more graceful form, by its lighter colored, close-growing bark, often covered with transverse scars (lenticels), by its small flowers in spreading clusters and by its very small globular fruit similarly clustered.



WILD RED CHERRY
Leaves, flowers and fruit, × ⅓

CHOKE CHERRY (WILD CHERRY). *Prunus Virginiana* Linn.

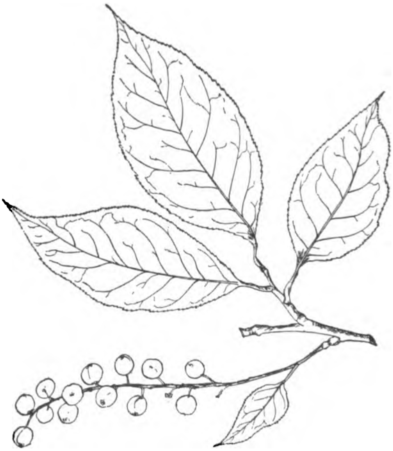


CHOKE CHERRY
Leaves, flowers and fruit, × ¼

The choke cherry is usually a shrub in Vermont. It is, however, included in this list of trees because of its close relationship to the other cherries. It is very widely distributed in North America, ranging from the Arctic circle to California and Texas. In May, when the leaves are half grown, it is covered with creamy white flowers in long nodding clusters. The peculiarly astringent fruit, varying greatly in quality, however, ripens abundantly in August. It makes a good quality of jelly.

BLACK CHERRY. *Prunus serotina* Ehrh.

This is the only native Vermont cherry which reaches a sufficient size to make it a valuable timber tree. It has been exported in considerable quantities from the southern part of the state, but now large trees are seldom found. The wood is of very superior quality for cabinet making, and commands the highest price of any native American timber. It has a beautiful grain and takes a very fine polish. The flowers resemble other cherry blossoms and are borne in racemes. The fruit is at first dark red, then becomes almost black, with a thick skin and dark juicy flesh, which is generally rather bitter but sometimes sweet and pleasant.



BLACK CHERRY

Leaves and fruit, × ⅓

PULSE FAMILY

Most of the members of this family are easily recognized as such by their irregular flowers of the pea-blossom type, by their fruit pod, similar to that of the pea or bean, and by their compound leaves.

All of them which are native plants are herbaceous. Many of the species which grow further south are shrubs and trees. Several of the latter are commonly cultivated in Vermont, including four trees, the common locust, the clammy locust, the honey locust and the coffeetree.

The common locust (*Robinia Pseudacacia* Linn.) is a native of Pennsylvania and the more southern states. It has been widely planted in Vermont and has frequently run wild along fence-rows and about yards. The profusion of the fragrant white blossoms, the delicacy of the foliage and the picturesque form of the tree combine to make it very attractive. This locust is a large, rapidly growing tree. It makes the best of fence posts and it is said that it can be grown with profit for that purpose in this state.

The clammy locust (*Robinia viscosa* Vent.) is a smaller tree which is sometimes planted for shade or ornament and tends to spread. It is easily distinguished by the fact that its twigs and leaf-stalks are clammy or sticky to the touch.

The honey locust (*Gleditsia triacanthos* Linn.) is occasionally planted. It is conspicuous because of its long pods, (one foot or more) and its much branched thorns. The leaves are doubly compound.

The Kentucky coffeetree (*Gymnocladus Canadensis* Lam.) is also occasionally planted. The leaves are doubly compound and two or three feet long. The pods are five to ten inches long and one to two inches broad.

MAPLE FAMILY

MAPLES

The maple family is a large one including nearly seventy species. Ten of these occur in the United States,and seven are found in Vermont. In many respects they form the most characteristic feature of our forest flora, and were we to select a state tree, popular choice would certainly be unanimous for the sugar maple.

The maples are easily distinguished from all other trees by their peculiar winged or "key" fruit. The leaves of all except the ash-leaved maple are also so similar as to form a good family character.

Two of the seven native species are as frequently shrubby as they are tree-like in both size and habit of growth, but all are included in this discussion. By appealing to the size of the tree and characters of the leaves it is possible to distinguish the species as follows:

Large trees.
- Leaves compound (3-7 leaflets), resembling the ash............Boxelder
- Leaves simple, with 3-5 prominent divisions or lobes.
  - Leaves with terminal lobe more than ½ length of midrib...Silver Maple
  - Leaves with terminal lobes ½ or less than ½ length of midrib.
    - Bottom of sinuses (i. e. larger notches or indentations) acute, lobes sharply toothed.......... ....Red Maple
    - Bottom of sinuses rounded, lobes with few or no teeth.

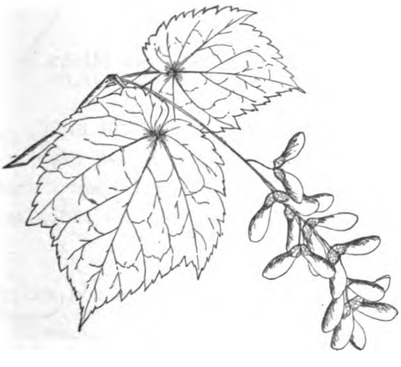
Sinuses deep, lower surfaces of leaves smooth or with few
hairs on veins...... ....Sugar Maple
Sinuses shallow, lower surfaces of leaves minutely hairy..Black Maple
Small trees or shrubs.
Leaves large (often 6-8 inches long), margins finely toothed, bark
light green striped with darker lines......... ....Striped Maple
Leaves smaller (3-5 inches long) margins coarsely toothed, bark
not striped....... ....Mountain Maple

Introduced species.—The Norway maple is a European species frequently used as a street shade tree farther south, and occasionally planted in Vermont. It most closely resembles the sugar maple among our native species but is easily distinguished by its broader and lower crown, larger leaves and larger, more divergent key-fruits.

Numerous horticultural varieties of the silver maple have been introduced in recent years, especially from Japan. These include very deeply cut-leaved forms, and also one with drooping branches. Their relationship to the native species is usually recognizable however.

The horse chestnuts and buckeyes are closely related to the maples, although some authorities place them in a separate family. Of these the European horse chestnut (*Aesculus Hippocastanum*) is very commonly cultivated. It forms a large, clean, symmetrical tree, with rich foliage and showy blossoms. The buckeyes of the south and west are occasionally planted.

MOUNTAIN MAPLE. *Acer spicatum* Lam.

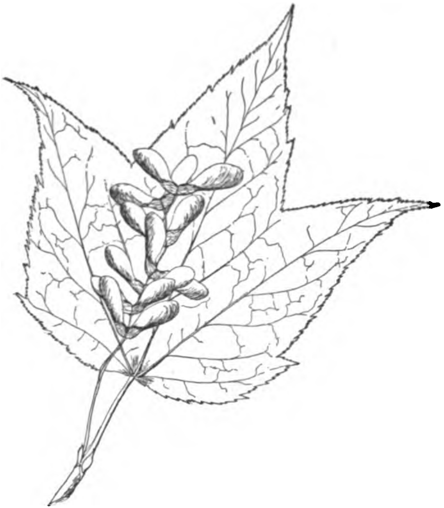


MOUNTAIN MAPLE

Leaves and fruit, × ⅛

The mountain maple rarely becomes more than a shrub in Vermont. It occurs commonly in moist, rocky mountain forests in all parts of the state. Like the striped maple it is partial to roadsides, and borders all our mountain driveways. The leaves are thin and downy on the under side. The greenish yellow flowers are borne in erect pubescent clusters which appear in the latter part of June. The fruits are very divergent, smaller than those of any other maple and become bright red in July and August. The heavy clusters then hang down and turn dark brown before being scattered by the winds. It is the spike-like arrangement of these flowers which suggested the Latin name of the species. This maple is one of the most highly ornamental of the smaller trees, and worthy of more general cultivation.

STRIPED MAPLE (MOOSEWOOD, STRIPED DOGWOOD). *Acer Pennsylvanicum* **Linn.**

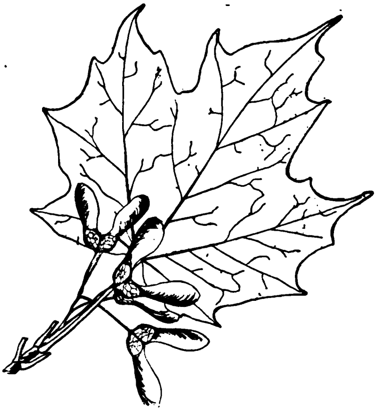


STRIPED MAPLE
Leaf and fruit, ×⅛

The striped maple is a small tree or shrub which forms a familiar part of the under growth of our forests, and is a common roadside bush in all parts of the state. It is easily distinguished by its greenish bark striped longitudinally with darker lines. The leaves, the largest of the maples, are usually from five to seven inches long and four or five inches wide. Its drooping clusters of greenish flowers unfold by the middle of June when the leaves are nearly grown. The fruits are abundant and turn a beautiful scarlet towards autumn. This maple rarely exceeds a height of twenty feet. It has also a distinct value for ornamental planting, especially in groups or borders.

SUGAR MAPLE (HARD MAPLE, ROCK MAPLE) *Acer barbatum* Michx., *A. saccharinum* Wang.

The sugar maple is at home everywhere in Vermont but it thrives best on the cool, rocky uplands of our state. It can be distinguished by its light gray bark which has large, white patches on the younger branches or by its broad, five-lobed leaves which have shallow, rounded sinuses. The small, inconspicuous flowers of the sugar maple appear with the leaves but the fruit does not ripen until late summer. This tree is widely distributed in North America but the fame of its sugar bearing sap has mainly spread from Vermont.

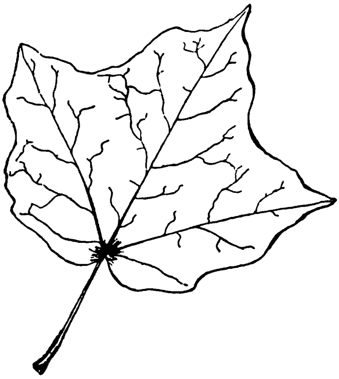


SUGAR MAPLE
Leaf and fruit, ×⅛

Besides its value as a sugar tree, its timber is hard and durable. It is extensively used for flooring, also for chair stock and other furniture and for fuel. The "curled" and "bird's-eye" maple are unusual forms of this species, produced by a peculiar curling of the fibers.

BLACK MAPLE *Acer barbatum nigrum* Sarg., *Acer saccharinum nigrum* T. & G., *Acer nigrum* Michx. f.

The above list of Latin names reveals the fact that this tree has long been a puzzle to botanists. In leaf characters it differs considerably from the sugar maple, but resembles it in fruit characters, general habit and in sugar production. As indicated in the key, the leaf is less deeply lobed, and is minutely hairy on the lower face; it may also be hairy along the leaf stalk. It is thicker and more leathery in texture and is usually heart-shape at the base, the rounded basal lobes sometimes overlapping. The typical form of the leaf is shown in the accompanying figure.



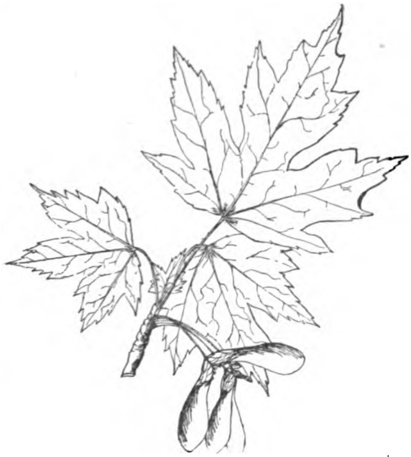
BLACK MAPLE, × ⅛

It is common in portions of Canada and farther west. In Vermont it seems to be rare, and has not been reported outside of the Champlain valley, except at Windsor. Michaux found it at the latter place about a century ago and its rediscovery there would be of considerable botanical interest. It is usually found in low moist places.

This black maple should not be confused with specimens of the ordinary sugar maple having darker bark. Sugar makers often term such trees "black maples." The bark of this black maple is generally dark, but the leaf characters must be appealed to in its recognition.

SILVER MAPLE (SOFT MAPLE, WHITE MAPLE, SWAMP MAPLE) *Acer saccharinum* Linn., *Acer dasycarpum* Ehrh.

The silver maple is a large, graceful tree, generally distributed along our water courses, especially near the shores of Lake Champlain and the streams emptying into it. It resembles the red maple but is



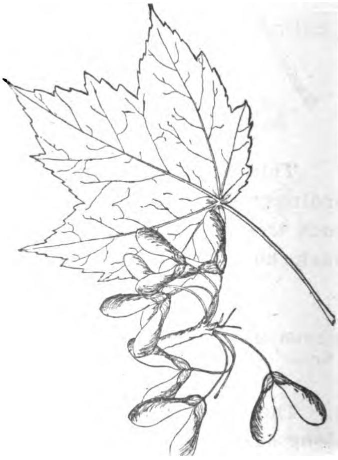
SILVER MAPLE
Leaves and fruit, x ⅓

distinguished from it by its longer, more deeply cut, lighter green leaves which are silvery white on the lower side. Although the silver maple flourishes best in moist soil, it will make vigorous growth and become a beautiful shade tree in dry locations. It is not so hardy or long lived as either the red or the sugar maple in many situations.

The fruits are two or three inches long ,larger than in either of the other species. They mature and fall in early summer.

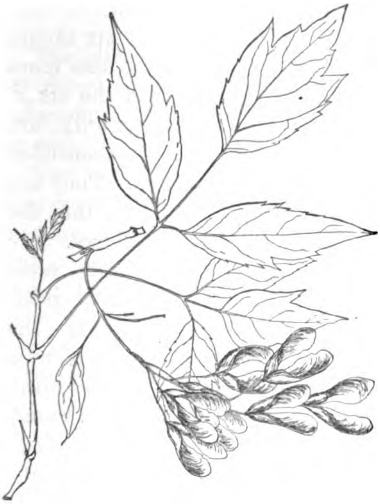
RED MAPLE (SOFT MAPLE, SWAMP MAPLE). *Acer rubrum* Linn.

The scarlet flowers of this maple give us the brightest spring welcome from the trees. When the red maple is a blaze of colors and the other trees are bare and brown, it is conspicuous and unmistakable, and in autumn the rich coloring of its leaves makes it conspicuous again. The leaves of the silver maple turn yellow and those of the sugar maple yellow or red, but not the crimson or deep red of the red maple. It is distinguished from the sugar maple by its smoother, dark gray bark and by the deeper acute incisions of the leaves although they are subject to much variation. The fruit is about one inch long and like that of silver maple falls in early summer. This tree, common throughout eastern United States, is very generally distributed in Vermont. It is especially found in low, moist soil. The red maple yields a sweet sap, inferior, however, to that of the sugar maple. The wood is rather soft with a fine smooth grain. "Curled" maple may occur in this species.



RED MAPLE
Leaf and fruit, x ⅓

BOXELDER (ASHLEAVED MAPLE). *Acer Negundo* Linn., *Negundo aceroides* Moench.



BOXELDER
Leaves and fruit, × ⅛

The leaves of the boxelder are compound with three or five or sometimes seven slender, somewhat lobed leaflets.

In its general habit and appearance and especially in this leaf character the boxelder much resembles the ashes, hence one of its popular names. A glance at the peculiar key fruit, however, shows it is in reality one of the maples. Its flowers appear in May. The fruit becomes conspicuous by the latter part of June but clings to the tree throughout the summer and autumn.

The boxelder occurs sparingly along streams in the Champlain valley, this marking its northern limit. It is very commonly planted, but its chief recommendation for this purpose is its quick growth.

BUCKTHORN FAMILY

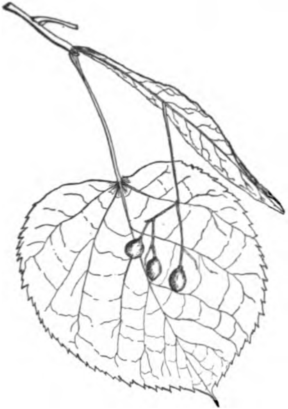
BUCKTHORN. *Rhamnus cathartica* Linn.

The buckthorn was introduced from Europe. It is commonly cultivated as a hedge plant, and occurs not infrequently as an escape. When left to itself it develops into a small and rather unsightly tree, bearing some resemblance to the wild plum. The most conspicuous character is its abundant fruit which occurs in clusters. It is berry-like with three or four seeds, one-third of an inch in diameter, and when ripe in autumn is black with green juice.

A medicinal syrup made from the berries was formerly much used. It is a powerful cathartic, and has fallen into disuse because of the violence of its action. Dyes can be made from different parts of the plant. The juice of the fresh berries yields a saffron color, and that of the bark a beautiful yellow. A fine green pigment used in water color painting under the name of sap-green is made from the berries in the early stages of ripeness.

LINDEN FAMILY

BASSWOOD (LINDEN). *Tilia Americana* Linn.



BASSWOOD
Leaf and fruit, × ⅓

The basswood is a widely scattered tree in Vermont, growing with the maples, oaks and elms. Its leaves are five or six inches long and nearly as wide, with a base more deeply cordate on one side than the other.

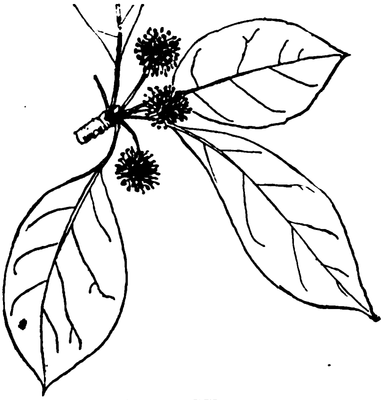
The flowers, which open in July, are creamy-white, borne in clusters suspended from a tongue-like leaf or bract. They are very fragrant and so full of nectar that the basswood is often called the bee-tree. The fruit ripens in autumn, forming hard brown balls or nutlets the size of peas. These may quite thickly sprinkle the ground near the trees, and give rise to a plentiful crop of seedlings the following spring. The tough inner bark (bast) gave origin to the common name. Basswood lumber is brownish or nearly white, light but rather tough, and is extensively used for drawers and similar cabinet work, panels, inside wood-work and for toys. Owing to the fact that it is readily bent it is used also for the bodies and dash boards of carriages and sleighs.

The European linden (*T. Europea*) is occasionally cultivated. It closely resembles the American species.

DOGWOOD FAMILY

SOUR GUM (TUPELO, PEPPERIDGE). *Nyssa sylvatica* Marsh.

The sour gum is found occasionally in swamps along the shores of Lake Champlain and in the adjacent river bottoms. It also occurs in the southwestern part of the state and has been found in the interior as far north as Craftsbury (Robbins). This tree has a peculiar appearance with horizontal branches and smooth or glossy leaves, borne in beech-like sprays. Its greenish yellow flowers appear in June and are followed by the dark-blue, egg-shaped fruits, one-half of an inch long, with thin, acid flesh, ripening in October.



SOUR GUM
Leaves and staminate flower clusters, × ½

OLIVE FAMILY

THE ASHES

The olive family takes its name from the olive tree of Asia. The only representatives among our native trees are the ashes; but several of the commonly planted ornamental shrubs, the lilacs and other syringas, and the beautiful forsythia, belong to this family.

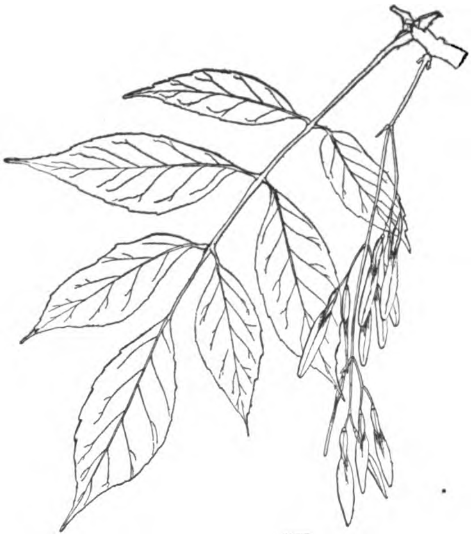
The individual flowers of the ashes are small. But the crowded clusters in which they appear before the leaves are quite conspicuous. The flowers are of two kinds, the pollen producing and the seed bearing being on separate trees. The ashes, like the maples, have prominently winged fruits, but those of the ash hang singly whereas the maple "keys" are always in pairs.

The ashes are among the most useful of the hard wood forest trees of America, yielding to the oaks alone in value. Two species, the black and the white, occur commonly throughout the state; the red and the green ash are restricted or local in their distribution. The latter two are very similar and intermediate forms connect them so closely that some authorities rate the green as but a variety of the red. In using the following key it is to be observed that the ash leaf is compound, that is, each leaf is divided into from seven to eleven smaller leaflets, as will be seen by examining any of the figures.

- Lateral leaflets sessile (i. e., without distinct stalks)............Black Ash
- Lateral leaflets with distinct stalks.
  - Buds, young shoots and leaf-stalks covered with fine velvety hairs..Red Ash
  - Buds, young shoots and leaf-stalks, smooth.
    - Leaves paler or downy beneath..........................White Ash
    - Leaves smooth and bright green on both sides..............Green Ash

WHITE ASH. *Fraxinus Americana* Linn.

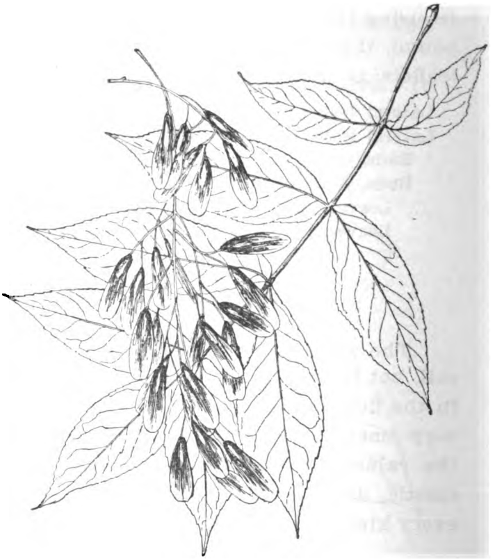
The white ash occurs in all parts of the state, and upon all kinds of soil, but it prefers a rich, moist location. It is an open spreading tree in the field but in the forest it sends up a clean, straight shaft with a very small head. This character helps to make the white ash one of the valuable timber trees of our forests. The wood is strong, tough, elastic, durable and easily worked. It is manufactured into casings, every kind of furniture, agricultural implements, and parts of carriages.



It is said that in strength and elasticity the white ash timber from Vermont is superior to that from most other sources. The white oak and the hickories are the only native trees which have a higher value for fuel. This ash is recognized by it compound leaves, about twelve inches long, with from five to nine smooth, petioled leaflets. The flowers appear before the leaves and the fruits ripen in August or September.

WHITE ASH
Leaf and fruit, × ⅛

BLACK ASH. *Fraxinus nigra* Marsh., *F. sambucifolia* Lamarck.

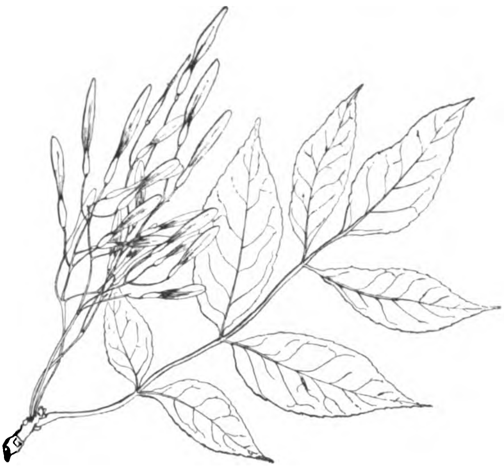


BLACK ASH
Leaf and fruit, × ⅛

The black ash is found in lowlands or swamps. It is often called the brown ash but this name is confusing as it is also applied to the red ash. This and the white species are the commoner ash trees of the state. They are easily distinguished by the fact that the leaflets of the white ash are always distinctly stalked while the black has sessile leaflets. These are seven to eleven in number often forming a leaf twelve to sixteen inches long which is smooth and green on both sides. Black ash timber is coarser grained than is that of white ash. It is used for furniture and inside finishings and in the manufacture of baskets.

RED ASH. *Fraxinus Pennsylvanica* Marsh., *F. pubescens* Lamarck.

The red ash closely resembles the whits ash in general appearance. It may always be recognized, however, by looking closely at the buds in winter or at the young shoots or petioles in summer. These parts are velvety with delicate hairs, and it is this characteristic pubescence which suggested the Latin name of the species. The flowers and fruits bear a general resemblance to those of the white ash. The red ash is used considerably in manufactures but is inferior to the preceding species for most purposes. It is generally distributed along the shores of Lake Champlain and its adjacent waters but has not been reported from other parts of the state.

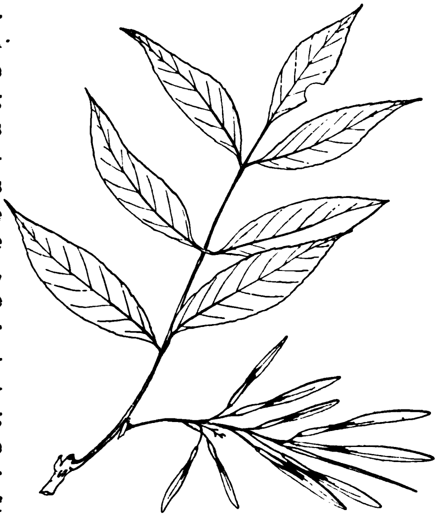


RED ASH

Leaf and fruit, x ⅛

GREEN ASH. *Fraxinus lanceolata* Borkh., *F. viridis* Michx.

Sargent considers this a variety of the red ash which it strongly resembles. The best means of distinguishing the green ash from the red is by its smooth buds, branchlets and leaf-stalks. It takes its name, green ash, from the fact that the leaflets are bright green on both sides, whereas those of both the white and the red are paler beneath. But these characters show clearly only in decided forms and perplexing intermediate forms may be found. It is known to occur sparingly on the shores of Lake Champlain, and probably does not grow native elsewhere in the state.



GREEN ASH

Leaf and fruit, x ⅛

BIGNONIA FAMILY

THE CATALPAS

Catalpa or indian-bean trees are occasionally planted in Vermont, although they are not always hardy. The peculiarities of fruit and foliage give them a somewhat tropical appearance. The leaves are heart-shape and very large, six to twelve inches long; the flowers are one or two inches across and the cylindrical pods nearly a foot in length. The species most commonly planted is the hardy American catalpa (*C. speciosa*). The Japanese catalpa (*C. Kaempferi*) is less commonly planted, but Mr. F. H. Horsford of Charlotte, who has it in cultivation, finds it to be hardy.

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NOTES ON THE TREES OF BURLINGTON AND VICINITY.*

BY L. R. JONES

THE PINES

38b

There is a small Austrian pine tree on the terrace near the street walk on Mr. Johonnott's lawn, 236 South Union, just below Maple street.

40a

The picturesque pine stump fences bear witness to the abundance and size of the white pines in the primeval forests in the vicinity of Burlington. The campus was originally covered with a mixed growth of white pine and hard wood. As this was removed second growth pine appeared. The grove adjacent to Converse Hall is a survival of this and now represents a growth of somewhat over sixty years. The group of pines on the College Park was planted by Chauncey Goodrich about 1855. The finest trees in the vicinity are in the lower part of Colonel Cannon's grounds.

Fine specimens of the red pine may be seen at Red Rocks. It is also common about Rock Point and occurs sparingly on the lighter soils north and east of the city. There is a medium-size tree just north of the house on the Misses Austin's lawn at the corner of Willard and Main streets.

40b

The pitch pine is very common on the sand plains about Fort Ethan Allen and in similar barren soils east and north of the city.

TAMARACK

The tamarack occurs in the swamps of the vicinity, such as in Porter's swamp on Colchester Point. There is a cluster of small trees near the south end of the College park.

42a

THE SPRUCES

The Norway spruce is a common shade tree. Fine large specimens occur in many yards, for example near the street walk in Mr. Mason's premises 439 College street. There is a fine collection of younger trees planted about twenty years ago on the terrace of the campus north of the President's house. It should be noted that a considerable variation is shown among these. The rapid growth of this spruce is well illustrated by the size of the tree in the row with the white spruces bordering the driveway east of the Wheeler house, corner of Prospect and Main streets. This was planted only thirty-four years ago (1865).

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* The paragraph numbers refer to the page in the body of the text where the species is described.

The Colorado blue spruce is of recent introduction. The best specimens which have come under our observation may be seen in the grounds of Mr. Woodhouse, near the corner of South Willard and Spruce streets. The largest of these were planted in 1891. Good types of this may also be seen in the east portion of Colonel Cannon's grounds, also at Professor Perkins' and in the Senator Edmunds' yard.

42b

The black or swamp spruce occurs in several of the cold swamps of the vicinity, such as the Higbee swamp, three miles east of the city on the Williston road. A small tree stands on the College park about four rods southeast of the LaFayette statue.

42b

The red spruce is the spruce of Mt. Mansfield and its foot-hills. It is common about Williston. Those desiring native spruce trees for transplanting should secure this, or better still, the next species rather than swamp spruce.

44a

The white spruce is common on Providence Island, and young trees suitable for transplanting may easily be obtained there. Several large trees of this species occur mingled with Norway spruce in the east portion of the Wheeler grounds, corner of Main and Prospect streets. The symmetry and fine color of this native spruce are well shown in the single tree which stands apart near the Main street line, about five rods west of the corner. The three trees standing in the row just east of the house were planted by President Wheeler about 1845.

HEMLOCK

Fine specimens of the hemlock are abundant on the ledges at Red Rocks. Some small trees occur on the Hutchinson lawn, 178 South Prospect street. There is a fine hemlock hedge about the Hickok property at the junction of Shelburne and St. Paul streets, also on the lower side of Colonel Cannon's grounds, South Willard street.

44b

BALSAM FIR

There are five small balsam firs among the Norway spruces on the terrace of the campus north of the President's house. The balsams are near the Colchester avenue line.

ARBOR VITAE (WHITE CEDAR)

The arbor vitæ—commonly called the white cedar—grows abundantly in this vicinity, especially near the lake. It is the commonest hedge plant of the city. The street hedge, on the south line of F. S. Pease's property at the head of College street, may be cited as an example. There are some rather large trees of this on the northwest part of the Medical college grounds.

46a

RED CEDAR (RED JUNIPER)

The red cedar occurs sparingly about Rock Point and Red Rocks. There are a couple of small trees on the College park, one being near the LaFayette statue, at the southeast. A large tree stands in the northwest part of the Medical college grounds.

46b

BUTTERNUT

Butternuts are not very common in this vicinity. There is a small tree near the southwest corner of the College park.

48a

THE HICKORIES

The shellbark hickory is common about Burlington, especially in the heavier soils south of the city. Numerous trees occur on South Union street, one standing on Mr. Southwick's lawn, No. 280. There are two larger trees just east of the Court-house.

48a

The bitternut hickory is common in this vicinity. There are several small specimens of it in the College park. The largest of these is near the University place road opposite the main building. Two young trees stand near the southwest corner of the park, where they were planted by Professor Goodrich in 1876. A larger tree occurs in the street-row in front of 388 Pearl street, near the head of Williams street.

50a

THE WILLOWS

The black willow is common along the banks of the Winooski river and on the lake shore.

The larger willow shade trees of the city are all either the crack willow or the white willow or some variety or hybrid of these. Both of these European willows and the native black willow occur along the lake shore near Howard Park. There is a large, old tree of the white or yellow willow in the northeast corner of Mr. John Allen's yard opposite the south end of the College park.

50b

The crack willow has been planted very commonly as a street and shade tree, especially in the section between North and North Bend streets.

THE POPLARS

The Lombardy poplar is commonly planted. There are numerous young trees in the grounds of Professor Emerson, corner of Summit and Maple streets, and several have recently been planted upon the campus. Larger specimens may be seen in the back part of the Edmunds grounds, near the east line. The most extensive planting of this poplar in the vicinity is on the estate of Mr. Henry Holt where they border the avenue leading to the house.

50b

There is a large white poplar tree on the campus immediately east of the driveway from Commons Hall to Colchester avenue. Another stands on the terrace at the east side of the Medical college. The longevity of the tree may be judged by two specimens on the south part of the Wheeler grounds, planted by President Wheeler about 1843.

52a

The American aspen is very common in the woodlands about the city, especially where they have recently been cut over. There are several small trees and one larger one near the clusters of arbor vitæ in the southwest part of the College park.

52a

The largetooth aspen is also common. It may easily be found near the power house at the gorge.

52a

The balm of Gilead occurs in the vicinity of the lake shore and in some of the moist ravines east of the city and is occasionally planted. An isolated tree may be seen on the west side of Shelburne street a few rods south of its junction with South Willard street.

52b

The cottonwood is abundant along the lake shore. It may be seen on the west slope of Battery park.

54a

THE BIRCHES

The birches planted in the city are nearly all the European white birch. Two typical young specimens of this stand in front of General Henry's house, 85 South Prospect street. A fine specimen of the weeping variety may be seen in the west part of the grounds of Mr. Hungerford, 303 Pearl street.

54a

The native white birch is especially abundant in the lighter soils east of the city.

54b

The paper birch is also common, but prefers the richer soils. It occurs frequently on the Holt estate and at Red Rocks. There is one tree on the southwest part of the College park.

54b

The sweet birch is not uncommon about Burlington, but is less easily recognized than the other species. There is one small tree near the south end of the College park.

54b

The yellow birch occurs in the cool ravines of the vicinity. A single tree may be seen near the street in the fence row bordering the north side of Mr. Richardson's grounds, 52 Williams street. Another stands in the southwest part of Dr. Prime's grounds, corner Pearl and Union streets. Veteran trees of this birch are common overhanging the trail and the roadway leading up the sides of Mt. Mansfield.

56a

HOP HORNBEAM

A specimen of the hop hornbeam occurs in the street row in front of the Experiment station office. It is common in the rocky woods about Burlington, especially at Red Rocks.

BLUE BEECH

The blue beech occurs not infrequently in the woodlands of this vicinity. It may be found, for example, in the groves at the east of Willard's ledge.

56b

BEECH

The beech occurs frequently in the woodlands about Burlington. There are two trees near the group of pines on the College park, the larger one being a few rods northwest of the pines. There is a fine beech is the street row in front of Mr. Robinson's, 384 Main street, just below Williams.

CHESTNUT

Native chestnut trees occur scattered through the woods on the Ethan Allen farm, near North avenue, and also near the lake shore at Eagle Bay. Two trees occur in the southeast corner of Dr. Prime's grounds, corner of Union and Pearl streets. Mrs. H. B. Willard states that the larger of these has grown from a nut planted by her grandfather, Ozias Buell, in 1805. The smaller one is a seedling from this and is about fifty years old.

58b

THE OAKS

The white oak is common all about Burlington. One of the three large trees standing in front of Converse Hall is of this species, the other two being red oaks.

58b

The swamp white oak is frequent along the lake shore and on the Winooski river intervales, especially near the mouth of the river. There is a fine young tree on the College park about opposite the south end of the Williams Science Hall.

60a

The red oak is very common in this vicinity. There is one tree on the College park a short distance north of the fountain. Two of the picturesque old oaks in front of Converse Hall are red oaks.

60a

The yellow oak is not uncommon in sandy soil about Burlington. It is a smaller tree than the red oak with rougher and darker bark.

60b

THE ELMS

The English cork elm is to be seen not infrequently in cultivation. There is a cluster of small trees on the College park near Prospect street, about opposite Professor Torrey's. A larger but less corky tree stands on the Hutchinson lawn, 178 South Prospect street.

A typical specimen of the weeping elm may be seen on the lawn of Mr. Pope, 371 Main street. Another stands in Mr. Morse's lot just north of the Medical college grounds on Prospect street.

60b
The white elm is the common shade tree of the city. A majority of the larger trees in the street rows were planted soon after the destruction of the locusts by the borer which occurred about 1845. One of the landmarks of the city is the large elm standing at the northwest corner of the Taft residence, 397 Pearl street. Mr. E. C. Loomis says that this was planted there nearly ninety years ago. The College street elms offer a good opportunity to trace the development and longevity of these trees. Mr. Edward Peck states that the two lofty elms standing on either side of the entrance to his grounds, 326 College street, were placed there by his father not later than 1809. The trees in the street row, just below, in front of the Mrs. John H. Peck place, were planted by Mrs. Peck in 1836, while the trees in the street row on the south side between the College street church and Winooski avenue were planted by Mr. L. E. Woodhouse and other High School students in 1877.

60b
The row of elms bordering the College park was planted in 1835, by the class of 1837. The park was at this time enclosed by a fence having the form of a greatly elongated oval. The elms were planted as a fence-row and the curvature in the line is clearly traceable at each corner. One of these trees about opposite Mr. G. G. Benedict's residence is noteworthy because of its curiously pendulous branches.

62a
The slippery elm is not common about the city. Only one tree has been located by the writer and it is not thought wise to betray it to possible bark hunters.

62a
Several trees of the native cork elm occur in the street row on the east side of North Prospect street. Two of them may be seen in front of Professor Barbour's house, corner of North Prospect and Loomis streets. No wild trees are known to occur nearer than Hinesburgh.

62b

HACKBERRY

There is a good specimen of the hackberry in the southwest corner of Dr. Prime's grounds at the junction of Pearl and Union streets.

64a

MULBERRY

The white mulberry occurs occasionally in cultivation or escaped.

TULIPTREE

The only specimen of the tulip tree observed in the city is in front of the greenhouse at the west side of the Mrs. John H. Peck house, 298 College street.

64b

SYCAMORE

Native sycamores occur occasionally near the lake shore, or along the banks of the river, especially near its mouth. Two trees may be seen in the street row on the east side of Pine street, just below Main in front of house No. 152.

66a

THE MOUNTAIN ASHES

The European mountain ashes are frequently seen in Burlington yards. One of the largest of these stands in the northwest part of the Medical college grounds. There are numerous seedling plants in the pine grove on the campus.

66b

A large specimen of the weeping mountain ash stands immediately north of Mr. Kimball's residence 236 South Prospect street. There is a smaller one on the lawn in front of the Taft residence, 397 Pearl street.

66b

A small specimen of the native American mountain ash may be seen just east of the porte-cochere in Dr. Willard's grounds at the corner of Loomis and North Prospect streets.

68a

SERVICEBERRY

The serviceberry or shadbush is abundant, especially in the sandy soil about Burlington, and so conspicuous when in blossom that it cannot be overlooked. There is a cluster of these trees on the north line of Mr. Gay's lawn, 194 South Prospect street, and a small tree in the east portion of Mr. Hungerford's grounds, corner South Willard and Pearl streets.

68b

THE HAWTHORNS

The only cultivated trees of the English hawthorn of which we recall the exact location were recently cut down. It occurs spontaneously near the brook in Foote's woods and may be looked for elsewhere in the woodlands about the city.

68b

Two small trees of the scarlet haw are located near the south end of the College park. Since the species is being split up into so many sub-species and varieties the various forms may be studied with renewed interest by local botanists.

70a

The longspine haw is especially common on the Holt estate and in the vicinity of Willard's ledge.

70a

Fine specimens of the dotted haw occur near the lime-kiln south of the High Bridge. Smaller trees are not uncommon. One may be seen near the street fence on the west side of South Prospect street a few rods north of Cliff street.

72a

CANADA PLUM

The Canada plum is not uncommon in fence rows and old gardens. A single tree stands in the vacant lot north of Professor Torrey's, 75 South Prospect street.

THE CHERRIES

The wild red cherry is common in fence rows and woodland borders.

72b

The choke cherry and black cherry are common along with the red cherry in the woodlands of the vicinity.

74a

THE LOCUSTS

A picturesque cluster of trees of the common locust may be seen in the east portion of the grounds of Mrs. Tucker at the corner of Pearl and Willard streets. The locust was the principal shade tree in the city until about 1845 when a large portion of the trees were destroyed by the borer. The large tree at the south end of Mr. G. G. Benedict's house was one of the few survivors. Mr. Benedict says that this tree is now fully eighty years old. Mr. E. C. Loomis states that the two trees standing near the front gate of the Brookes' place, 340 Pearl street, have grown from seed planted by his father about 1803.

74a

The street now known as Elmwood avenue was formerly lined with locusts and known as Locust street.

74a

A small tree of the honey locust stands in the garden of the Taft residence, 397 Pearl street. There is a young honey locust hedge in front of Saint Mary's convent, Mansfield avenue.

KENTUCKY COFFEETREE

A fine specimen of the Kentucky coffeetree stands near the west piazza of Mr. Lawrence Bartley's house on College street, just above Union. There is another in the grounds of Mr. Edward Peck, 326 College street.

74b

MAPLES. HORSE CHESTNUTS. BOX ELDER

The Norway maple has been planted occasionally in recent years and makes a very desirable shade tree. A fine young specimen of this maple stands close to the street walk on the lawn at No. 13 South Union street.

74b
Varieties of the cutleaf maple are not infrequent among the more recently planted ornamental trees. One may be seen in the Main street row on the north side of Grass Mount.

Horse chestnuts are not uncommonly planted. A large tree shades the west piazza of Mr. Van Patten's residence, 386 Pearl street. There are several fine specimens in the grounds of Mr. B. B. Smalley, 47 Adams street.

74b
The buckeyes are rarely planted. There is a thrifty young specimen of the Ohio buckeye in the north part of Professor Perkins' grounds, 205 South Prospect street.

74b
The mountain maple may be found near the High Bridge and in similar cool moist situations in the vicinity.

76a
The striped maple is not uncommon in our woodlands. It is especially frequent in the vicinity of Eagle Bay in the groves bordering the Rutland railroad.

76a
The sugar maple is common everywhere. A fine row of old trees borders the north line of the Edmunds high school grounds. A typical large tree occurs at the west of the driveway in Mr. Van Patten's grounds, 386 Pearl street. Mr. Horatio Loomis states that this was planted by his grandfather about seventy-five years ago.

78a
The silver maple is not uncommon in moist soil along our lake shore and river banks. A large tree stands in the street row in front of Mr. Edward Peck's place, 326 College street. Mr. Peck states that this tree was planted there about forty years ago. Probably the finest specimen of maple in the city is that on the lawn of Mr. Henry Wells at the west of the house, 378 Main street. Our attention was but recently called to this tree and we have not examined it in summer. Some leaves gathered from the ground indicate that it is one of the cut-leaf varieties of the silver maple.

78a
The red maple, both wild and cultivated, is fully as common in this vicinity as is the sugar maple. The double tree about the middle of the College park, immediately southeast of the pines is of this spe-

cies. It was planted together with the other trees in this group by the graduating class of 1847.

78b

The boxelder is frequently planted as a shade tree. A large spreading tree stands near the south line of the premises at 43 South Prospect street. There are numerous smaller trees in the east portion of Mr. Hungerford's grounds at the junction of Pearl and Willard streets, one standing very close to the fence corner.

BUCKTHORN

The buckthorn is frequently used as a hedge plant. One of the largest of these hedges forms the south border of the grounds of Mr. Brookes, 362 South Prospect street. A single fruit-bearing plant stands on the College park, about opposite General Henry's residence.

80a.

BASSWOOD

The basswood is common as a wild tree in the vicinity and is frequently planted. The street shade trees about the Wheeler property at the corner of South Prospect and Main streets are of this species and were planted about fifty years ago. A larger and finer specimen stands about the middle of the north row of trees in the First church parsonage grounds.

SOUR GUM

The sour gum is a rare tree about Burlington. The only specimens known occur near the new Rutland-Canadian railroad bridge at the mouth of the river.

82a

THE ASHES

Several specimens of the white ash are growing near the south end of the College park.

82a

The black ash occurs in the moist soils of the vicinity.

82b

The red ash is very common along the sandy beaches of the lake shore and has been transplanted quite frequently to the yards and street rows about the city. A large tree stands on the College park near the walk leading southeast from the head of College street.

84a

THE CATALPAS

The hardy American catalpa has been planted in numerous yards, but it is not fully hardy and no specimens have reached a large size. As large and typical a specimen as we have seen stands near the driveway on the south side of Mr. John Allen's house, corner Main and Prospect streets.

84a

Small specimens of the Japanese catalpa occur in numerous yards. The largest one that we have observed stands in the street row in front of 78 Adams, just east of Elm street. The Japanese species appears to be a hardier plant than either of our Americans. It is easily distinguished from them by its more slender pods.

84a

The southern catalpa, *C. bignonioides*, has also been planted occasionally. A specimen stands near the street fence in the Hagar garden, 323 College street.

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